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SMITH'S INTRODUCTORY ARITHMETIC.

THE

L I T T L E

FEDERAL CALCULATOR:

CONSISTING OF

QUESTIONS AND TABLES

TO

EMPLOY THE MIND AND FINGERS ONLY;

DESIGNED PARTICULARLY

TO GO BEFORE THE SLATE,

AND

TO PREPARE FOR IT.

BY ROSWELL C. SMITH,

AUTHOR OF PRACTICAL AND MENTAL ARITHMETIC, INTELLECTUAL
AND PRACTICAL GRAMMAR, AND THE PRODUCTIVE GRAMMAR.

Stereotyped Edition.

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1911

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By ROSWELL C. SMITH,

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SMITH'S PRODUCTIVE GRAMMAR.

THIS work, which is in very general use throughout the country is published by WILLIAM MARSHALL & Co., Philadelphia; OLIVER L. SANBORN, Concord; ROE LOCKWOOD, New York; T. & M. BUTLER, Buffalo, N. Y.; DANIEL BURGESS & Co., Hartford; RUSSELL, SHATTUCK & Co., Boston; and is for sale by all the principle Booksellers in the United States.

MENTAL ARITHMETIC.

ADDITION.

Q. 1. How many little fingers have you on your right hand? How many on your left? How many on both?

Q. 2. How many eyes have you?

Q. 3. If you have two apples in one hand, and one in the other, how many have you in both? How many are two and one, then, put together?

Q. 4. How many do your ears and eyes make, counted together?

Q. 5. If you have two nuts in one hand, and two in the other, how many have you in both? How many do two and two make, put together?

Q. 6. If you have three pins in one hand, and James puts another in, how many will you have in your hand? How many are three and one then?

Q. 7. If you have three pins in one hand, and James puts two more in, how many will you have in your hand? How many are three and two then?

Q. 8. If you have four apples in one pocket, and two in the other, how many will you have in both? How many are four and two then?

Q. 9. Thomas has four cents, and William has three; how many have they both together? How many are four and three then?

Q. 10. You have five pins in one hand, and three in the other; how many have you in both? How many are five and three then?

Q. 11. You have four nuts in one hand, and four in the other; how many have you in both? How many are four and four then?

Q. 12. If you count the fingers and thumb on one hand, and only the fingers on the other, how many will they make? How many are five and four then?

Q. 13. How many fingers and thumbs have you on both?

Q. 14. James has five marbles, and Thomas five; how many have they both? How many are five and five then?

ADDITION.

Q. 15. How many cents would it take to buy two whistles, if one cost six cents, and the other four? How many are six and four then?

Q. 16. If you have eight pins on one sleeve, and two on the other, how many will you have on both? How many are eight and two then?

Q. 17. How many legs have two cows and a bird?

Q. 18. If I should give you six cents, and you should find five, how many would you have then? How many are six and five then?

Q. 19. If you count all your fingers, thumbs, and nose, how many will they make?

Q. 20. If you buy a picture-book for ten cents, and a pear for two cents, how many cents will pay for both? How many are ten and two then?

Q. 21. How much money would you have, if your father should give you seven cents, and your brother six? How many are seven and six then?

Q. 22. If you have seven pins in one hand, and seven in the other, how many will you have in both? How many are seven and seven then?

Q. 23. A man bought a chair for three dollars, and a looking-glass for twelve; how much did he give for both? How many are three and twelve then?

Q. 24. You give thirteen cents for a spelling-book, and three for an inkstand; how much do they come to? How many are thirteen and three?

Q. 25. Count one hundred.

One	1	Twenty	20
Two	2	Twenty-one	21
Three	3	Twenty-two	22
Four	4	Twenty-three	23
Five	5	Twenty-four	24
Six	6	Twenty-five	25
Seven	7	Twenty-six	26
Eight	8	Twenty-seven	27
Nine	9	Twenty-eight	28
Ten	10	Twenty-nine	29
Eleven	11	Thirty	30
Twelve	12	Thirty-one, &c.	31
Thirteen	13	Forty	40
Fourteen	14	Fifty	50
Fifteen	15	Sixty	60
Sixteen	16	Seventy	70
Seventeen	17	Eighty	80
Eighteen	18	Ninety	90
Nineteen	19	One hundred	100

Note.—The pupil is to recite the above, with the written numbers covered.

over. The answers to the following questions are to be given by writing them on the slate at recitation, to test the pupil's knowledge of numbers from one to one hundred.

Q. 26. Write down in proper figures, four; seven; eight; twelve; eighteen; twenty-two; thirty-two; forty-five; forty-nine; fifty-six; fifty-nine; sixty-three; seventy-five; eighty-seven; ninety-two; ninety-seven; ninety-nine.

Q. 27. James has seventy-eight cents, and Rufus eighty-seven cents; which has the most?

Q. 28. Thomas has fifty-nine dollars, and William sixty-nine; which has the most? Which is the most, eighty-nine or ninety-nine? Forty-seven or seventy-four?

ADDITION TABLE.

2 and 0 are	2	3 and 0 are	3	4 and 0 are	4
2 and 1 are	3	3 and 1 are	4	4 and 1 are	5
2 and 2 are	4	3 and 2 are	5	4 and 2 are	6
2 and 3 are	5	3 and 3 are	6	4 and 3 are	7
2 and 4 are	6	3 and 4 are	7	4 and 4 are	8
2 and 5 are	7	3 and 5 are	8	4 and 5 are	9
2 and 6 are	8	3 and 6 are	9	4 and 6 are	10
2 and 7 are	9	3 and 7 are	10	4 and 7 are	11
2 and 8 are	10	3 and 8 are	11	4 and 8 are	12
2 and 9 are	11	3 and 9 are	12	4 and 9 are	13
2 and 10 are	12	3 and 10 are	13	4 and 10 are	14
2 and 11 are	13	3 and 11 are	14	4 and 11 are	15
2 and 12 are	14	3 and 12 are	15	4 and 12 are	16
5 and 0 are	5	6 and 0 are	6	7 and 0 are	7
5 and 1 are	6	6 and 1 are	7	7 and 1 are	8
5 and 2 are	7	6 and 2 are	8	7 and 2 are	9
5 and 3 are	8	6 and 3 are	9	7 and 3 are	10
5 and 4 are	9	6 and 4 are	10	7 and 4 are	11
5 and 5 are	10	6 and 5 are	11	7 and 5 are	12
5 and 6 are	11	6 and 6 are	12	7 and 6 are	13
5 and 7 are	12	6 and 7 are	13	7 and 7 are	14
5 and 8 are	13	6 and 8 are	14	7 and 8 are	15
5 and 9 are	14	6 and 9 are	15	7 and 9 are	16
5 and 10 are	15	6 and 10 are	16	7 and 10 are	17
5 and 11 are	16	6 and 11 are	17	7 and 11 are	18
5 and 12 are	17	6 and 12 are	18	7 and 12 are	19

ADDITION.

8 and 0 are 8	9 and 0 are 9	10 and 0 are 10
8 and 1 are 9	9 and 1 are 10	10 and 1 are 11
8 and 2 are 10	9 and 2 are 11	10 and 2 are 12
8 and 3 are 11	9 and 3 are 12	10 and 3 are 13
8 and 4 are 12	9 and 4 are 13	10 and 4 are 14
8 and 5 are 13	9 and 5 are 14	10 and 5 are 15
8 and 6 are 14	9 and 6 are 15	10 and 6 are 16
8 and 7 are 15	9 and 7 are 16	10 and 7 are 17
8 and 8 are 16	9 and 8 are 17	10 and 8 are 18
8 and 9 are 17	9 and 9 are 18	10 and 9 are 19
8 and 10 are 18	9 and 10 are 19	10 and 10 are 20
8 and 11 are 19	9 and 11 are 20	10 and 11 are 21
8 and 12 are 20	9 and 12 are 21	10 and 12 are 22
<hr/>		
11 and 0 are 11	11 and 9 are 20	12 and 4 are 16
11 and 1 are 12	11 and 10 are 21	12 and 5 are 17
11 and 2 are 13	11 and 11 are 22	12 and 6 are 18
11 and 3 are 14	11 and 12 are 23	12 and 7 are 19
11 and 4 are 15		12 and 8 are 20
11 and 5 are 16	12 and 0 are 12	12 and 9 are 21
11 and 6 are 17	12 and 1 are 13	12 and 10 are 22
11 and 7 are 18	12 and 2 are 14	12 and 11 are 23
11 and 8 are 19	12 and 3 are 15	12 and 12 are 24

Q. 29. Will you repeat the table, beginning with 2 and 0 are 2? with 3? 4? 5? 6? 7? 8? 9? 10? 11? 12?

Q. 30. How many are 2 and 5? 2 and 7? 2 and 10? 2 and 12? 3 and 3? 3 and 9? 3 and 12? 4 and 2? 4 and 6? 4 and 8? 4 and 10? 4 and 12? 5 and 3? 5 and 5? 5 and 9? 5 and 11? 6 and 4? 6 and 7? 6 and 10? 6 and 12? 7 and 2? 7 and 7? 7 and 9? 7 and 12? 8 and 2? 8 and 5? 8 and 7? 8 and 9? 8 and 10? 8 and 12? 9 and 6? 9 and 9? 9 and 12? 10 and 3? 10 and 4? 10 and 6? 10 and 8? 10 and 11? 10 and 12? 12 and 3? 12 and 6? 12 and 9? 12 and 12?

Q. 31. You borrow 12 dollars at one time, and 2 at another; how much have you borrowed in all? How many are 12

has 11 cents, and James 11; how many do
 how many are 11 and 11?
 ight a cart for 13 dollars, and a plough for
 h did he pay for both? How many are 13

Q. 34. A man bought 10 bushels of rye for 15 dollars, 6 bushels of apples for 6 dollars; how much did he pay for both? How many are 15 and 6?

Q. 35. William has 4 marbles in one pocket, 6 in the other, and 3 in his right hand; how many has he in all? How many are 4, 6 and 3?

Q. 36. Peter gave to his companions apples as follows: to James 7, to Henry 9, to William 10; how many did he give away? How many are 7, 9, and 10?

Q. 37. Rufus has 12 cents, James 12, and Thomas 2; if Rufus and James should give Thomas all their cents, how many would Thomas have? How many are 12, 12, and 2?

Q. 38. You give 16 cents for a knife, 4 cents for an inkstand, and 5 for a lead pencil; how much will all of them come to? How many are 16, 4, and 5?

Q. 39. Your brother William gave you 19 cents, your brother John 10, and your cousin 2; how many did you have given you in all? How many are 19, 10, and 2?

Q. 40. How many are 6 and 4? 16 and 4? 26 and 4? 36 and 4? 46 and 4? 56 and 4? 66 and 4? 76 and 4? 86 and 4? 96 and 4? 10 and 5? 20 and 5? 40 and 5? 70 and 5? 6 and 10? 6 and 40? 6 and 70? 7 and 3? 17 and 3? 37 and 3? 57 and 3? 77 and 3? 97 and 3? 5 and 5? 5 and 15? 5 and 20? 25 and 5? 30 and 5? 45 and 5? 60 and 5? 75 and 5? 95 and 5? 8 and 4? 18 and 4? 28 and 4? 38 and 4? 48 and 4? 58 and 4? 68 and 4? 78 and 4? 88 and 4? 98 and 4? 9 and 3? 19 and 3? 29 and 3? 49 and 3? 79 and 3? 89 and 3? 6 and 5? 6 and 15? 6 and 25? 6 and 35? 6 and 45? 6 and 65? 6 and 85? 6 and 95?

Q. 41. Will you repeat the Table of Addition backwards, beginning with 2 and 12 are 14? 2 and 11 are 13? with 3 and 12? 4 and 12? 5 and 12? 6 and 12? 7 and 12? 8 and 12? 9 and 12? 10 and 12? 11 and 12? 12 and 12?

SUBTRACTION.

Q. 42. If you should lose 1 finger from one hand, how many would you have left on that hand? How many are 4 less 1? Why?

A. Because 1 and 3 are 4.

Q. 43. If you have 5 cents, and give away 2, how many have left? How many are 5 less 2 then? Why?

Q. 44. If you shut both your little fingers, and less fingers open, how many will be open? How many less 2?

Q. 45. If you have 8 cents, and lose 3, how many will you have left? How many are 8 less 3?

Q. 46. If you have 9 cents in a box, and take out 4, how many will be left in the box? How many are 9 less 4, or 4 from 9?

Q. 47. You borrow 8 pins, and pay 4; how many do you still owe? How many are 4 from 8 then?

Q. 48. If you have 12 dollars, and lose 2, how many will you have left? How many are 2 from 12 then?

Q. 49. A man, owing 20 dollars, paid 16; how many remain to be paid? How many are 16 from 20 then?

Q. 50. You gave 18 cents for an inkstand, and sold it for 16 cents; did you make or lose, and how much? How many are 16 from 18 then?

Q. 51. Your papa gave you 9 dollars, and you gave your brother 5; how many had you left? How many are 5 from 9 then? Why?

Q. 52. William bought a knife for 20 cents, and sold it for 22; how much did he make in trading? How many are 20 from 22 then?

Q. 53. A man bought a barrel of molasses for 15 dollars, and sold it for 19; how much more than he gave for it did he sell it for? How many are 15 from 19 then?

Q. 54. William has apples in both pockets; in one pocket he has 11, in the other 18; how many has he in one pocket more than in the other? How many are 11 from 18 then? Why?

Q. 55. A boy gave 17 cents for some picture-books, which were worth no more than 10 cents; how much more than their worth did he pay for them? How many are 10 from 17?

Q. 56. A man bought a cow for 13 dollars, and a calf for 3; how much more did the cow cost than the calf? How many are 3 from 13?

Q. 57. A man bought a barrel of flour for 17 dollars, and, not proving so good as he expected, he could sell it for no more than 13 dollars; how much did he lose on it? How many are 13 from 17?

Q. 58. A man bought a barrel of beef for 20 dollars, and, being damaged, he is obliged to lose 12 dollars on the sale of it; how much did he sell it for? How many are 12 from 20 then?

Q. 59. How many legs will 4 chairs have to stand on, if 1 have 3 broken legs? How many are 3 from 16?

Q. 60. Twenty birds light on a tree; if 6 fly off, how many are left on the tree? How many are 6 from 20?

Q. 61. Suppose you and William lose a finger apiece, how will you both have then? How many are 2

ve 25 cents, and give 20 for a knife, and the
s, how many cents will the marbles cost?

Q. 63. A poor man had 16 bushels of rye given him; his oldest son gave him 10 bushels, and his youngest the rest; how many bushels did the youngest give him? How many more did the oldest give him than the youngest? How many are 10 from 16? 6 from 10?

Q. 64. Twenty-eight boys were sliding on the ice, which breaking, all but 4 fell in and perished; how many lost their lives? How many are 4 from 28? Why?

Q. 65. If you buy 15 cents' worth of tape, and give the shop-keeper a pistareen, or twenty cent bit, how many cents must he give you in change? How many are 15 from 20? Why?

Q. 66. If you had 17 fingers, how many would you have more than you have now? How many are 8 from 17?

Q. 67. A man had to travel 24 miles, but has travelled all but 4; how many miles has he journeyed? How many are 4 from 24?

Q. 68. Twenty children are in a class, and the 8 best are put in a higher class; how many are left in the lower class? How many are 8 from 20?

Q. 69. If you have 25 cents, and should give 10 cents for a ruler, and 10 for a top, how many cents will you have left? How many do 10 and 10 from 25 leave? Why?

SUBTRACTION TABLE.

1 from 1 leaves 0	2 from 2 leaves 0	3 from 3 leaves 0
1 from 2 leaves 1	2 from 3 leaves 1	3 from 4 leaves 1
1 from 3 leaves 2	2 from 4 leaves 2	3 from 5 leaves 2
1 from 4 leaves 3	2 from 5 leaves 3	3 from 6 leaves 3
1 from 5 leaves 4	2 from 6 leaves 4	3 from 7 leaves 4
1 from 6 leaves 5	2 from 7 leaves 5	3 from 8 leaves 5
1 from 7 leaves 6	2 from 8 leaves 6	3 from 9 leaves 6
1 from 8 leaves 7	2 from 9 leaves 7	3 from 10 leaves 7
1 from 9 leaves 8	2 from 10 leaves 8	3 from 11 leaves 8
1 from 10 leaves 9	2 from 11 leaves 9	3 from 12 leaves 9
1 from 11 leaves 10	2 from 12 leaves 10	3 from 13 leaves 10
1 from 12 leaves 11	2 from 13 leaves 11	3 from 14 leaves 11
1 from 13 leaves 12	2 from 14 leaves 12	3 from 15 leaves 12

4 from 4 leaves 0	4 from 9 leaves 5	4 from 14 leaves 10
4 from 5 leaves 1	4 from 10 leaves 6	4 from 15 leaves 11
4 from 6 leaves 2	4 from 11 leaves 7	4 from 16 leaves 12
4 from 7 leaves 3	4 from 12 leaves 8	4 from 17 leaves 13
4 from 8 leaves 4	4 from 13 leaves 9	4 from 18 leaves 14

5 from 5 leaves 0	5 from 14 leaves 9	6 from 10 leaves 4
5 from 6 leaves 1	5 from 15 leaves 10	6 from 11 leaves 5
5 from 7 leaves 2	5 from 16 leaves 11	6 from 12 leaves 6
5 from 8 leaves 3	5 from 17 leaves 12	6 from 13 leaves 7
5 from 9 leaves 4		6 from 14 leaves 8
5 from 10 leaves 5	6 from 6 leaves 0	6 from 15 leaves 9
5 from 11 leaves 6	6 from 7 leaves 1	6 from 16 leaves 10
5 from 12 leaves 7	6 from 8 leaves 2	6 from 17 leaves 11
5 from 13 leaves 8	6 from 9 leaves 3	6 from 18 leaves 12

7 from 7 leaves 0	8 from 8 leaves 0	9 from 9 leaves 0
7 from 8 leaves 1	8 from 9 leaves 1	9 from 10 leaves 1
7 from 9 leaves 2	8 from 10 leaves 2	9 from 11 leaves 2
7 from 10 leaves 3	8 from 11 leaves 3	9 from 12 leaves 3
7 from 11 leaves 4	8 from 12 leaves 4	9 from 13 leaves 4
7 from 12 leaves 5	8 from 13 leaves 5	9 from 14 leaves 5
7 from 13 leaves 6	8 from 14 leaves 6	9 from 15 leaves 6
7 from 14 leaves 7	8 from 15 leaves 7	9 from 16 leaves 7
7 from 15 leaves 8	8 from 16 leaves 8	9 from 17 leaves 8
7 from 16 leaves 9	8 from 17 leaves 9	9 from 18 leaves 9
7 from 17 leaves 10	8 from 18 leaves 10	9 from 19 leaves 10
7 from 18 leaves 11	8 from 19 leaves 11	9 from 20 leaves 11
7 from 19 leaves 12	8 from 20 leaves 12	9 from 21 leaves 12

10 from 10 leaves 0	11 from 11 leaves 0	12 from 12 leaves 0
10 from 11 leaves 1	11 from 12 leaves 1	12 from 13 leaves 1
10 from 12 leaves 2	11 from 13 leaves 2	12 from 14 leaves 2
10 from 13 leaves 3	11 from 14 leaves 3	12 from 15 leaves 3
10 from 14 leaves 4	11 from 15 leaves 4	12 from 16 leaves 4
10 from 15 leaves 5	11 from 16 leaves 5	12 from 17 leaves 5
10 from 16 leaves 6	11 from 17 leaves 6	12 from 18 leaves 6
10 from 17 leaves 7	11 from 18 leaves 7	12 from 19 leaves 7
10 from 18 leaves 8	11 from 19 leaves 8	12 from 20 leaves 8
10 from 19 leaves 9	11 from 20 leaves 9	12 from 21 leaves 9
10 from 20 leaves 10	11 from 21 leaves 10	12 from 22 leaves 10
10 from 21 leaves 11	11 from 22 leaves 11	12 from 23 leaves 11
	11 from 23 leaves 12	12 from 24 leaves 12

at the Table, beginning with 1; as, 1
 1? 3? 4? 5? 6? 7? 8? 9? 10? 11? 12?

Q. 71. How many does 2 from 8 leave? 2 from 10? 2 from 12? 2 from 15? 2 from 20? 2 from 24? 3 from 7? 3 from 10? 3 from 12? 3 from 18? 3 from 19? 4 from 8? 4 from 9? 4 from 13? 4 from 15? 4 from 18? 4 from 20? 5 from 10? 5 from 14? 5 from 17? 5 from 20? 5 from 25? 6 from 12? 6 from 18? 6 from 20? 6 from 26? 7 from 14? 7 from 21? 7 from 23? 8 from 10? 8 from 12? 8 from 15? 8 from 16? 8 from 19? 8 from 20? 9 from 12? 9 from 15? 9 from 18? 9 from 20? 9 from 22? 10 from 15? 10 from 17? 10 from 20? 10 from 22? 10 from 25? 11 from 15? 11 from 18? 11 from 19? 11 from 22? 12 from 14? 12 from 16? 12 from 19? 12 from 24?

Q. 72. You have 16 apples, and give 5 to your sister, and 5 to your brother; how many will you have left? How many do 5 and 5 from 16 leave?

Q. 73. A man bought a mirror for 12 dollars, for which he gave 6 bushels of corn, worth 5 dollars, 3 bushels of potatoes, worth 1 dollar, and the rest in money; how much did he pay? How many do 5 and 1 from 12 leave?

Q. 74. The distance from Boston to Walpole is 20 miles; after you have arrived at Dedham, which is 11 miles from Boston, how many more miles will you have to travel to reach Walpole? How many are 11 from 20? Why?

Q. 75. Will you now repeat the Table of Subtraction backwards, beginning with 1 from 13? with 2 from 14? 3 from 15? 4 from 16? 5 from 17? 6 from 18? 7 from 19? 8 from 20? 9 from 21? 10 from 22? 11 from 23? 12 from 24?

MULTIPLICATION.

Q. 76. If I give you 2 pins at one time, and 2 at another, how many pins will you have? How many are 2 times 2, then?

Q. 77. How many legs have 2 chairs? How many are 2 times 4?

Q. 78. How many eyes have 6 birds? How many 7? How many 8? How many are 2 times 6? 2 times 7? 2 times 8?

Q. 79. I hold my hand out, and you put 3 pins in it, William 3, and James 3; how many pins have I? How many are 2 times 3?

Q. 80. If I put in your pocket 4 apples, how many apples will you have? How many?

Q. 81. If I should give you 4 apples at a time, how many apples will you have? How many?

Q. 82. If I give 2 cents for 1 orange, how many cents must I give for 8? How many are 2 times 8?

Q. 83. How many cents will buy 10 marbles, if one cost 3 cents? How many are 3 times 10?

Q. 84. If you give 4 cents for a yard of tape, how many cents will buy 3 yards? How many 4? 5? 6? 7? How many are 4 times 3? 4 times 4? 4 times 5? 4 times 6?

Q. 85. What will 5 picture-books come to, at 2 cents apiece? What will 6? 7? 8? 9? 10? 11? 12? How many are 5 times 2? 6 times 2? 7 times 2? 8 times 2? 9 times 2? 10 times 2? 11 times 2? 12 times 2?

Q. 86. What will 2 marbles cost, at 3 cents apiece? will 3 marbles? will 4? will 5? will 6? will 7? will 8? will 9? will 10? will 11? How many are 3 times 2? 3 times 3? 3 times 4? 3 times 5? 3 times 6? 3 times 7? 3 times 8? 3 times 9? 3 times 10? 3 times 11?

MULTIPLICATION TABLE.

2 times 0 are 0	3 times 0 are 0	4 times 0 are 0
2 times 1 are 2	3 times 1 are 3	4 times 1 are 4
2 times 2 are 4	3 times 2 are 6	4 times 2 are 8
2 times 3 are 6	3 times 3 are 9	4 times 3 are 12
2 times 4 are 8	3 times 4 are 12	4 times 4 are 16
2 times 5 are 10	3 times 5 are 15	4 times 5 are 20
2 times 6 are 12	3 times 6 are 18	4 times 6 are 24
2 times 7 are 14	3 times 7 are 21	4 times 7 are 28
2 times 8 are 16	3 times 8 are 24	4 times 8 are 32
2 times 9 are 18	3 times 9 are 27	4 times 9 are 36
2 times 10 are 20	3 times 10 are 30	4 times 10 are 40
2 times 11 are 22	3 times 11 are 33	4 times 11 are 44
2 times 12 are 24	3 times 12 are 36	4 times 12 are 48
5 times 0 are 0	5 times 9 are 45	6 times 4 are 24
5 times 1 are 5	5 times 10 are 50	6 times 5 are 30
5 times 2 are 10	5 times 11 are 55	6 times 6 are 36
5 times 3 are 15	5 times 12 are 60	6 times 7 are 42
5 times 4 are 20		6 times 8 are 48
	6 times 0 are 0	6 times 9 are 54
	6 times 1 are 6	6 times 10 are 60
	6 times 2 are 12	6 times 11 are 66
	6 times 3 are 18	6 times 12 are 72

7 times 0 are 0	8 times 0 are 0	9 times 0 are 0
7 times 1 are 7	8 times 1 are 8	9 times 1 are 9
7 times 2 are 14	8 times 2 are 16	9 times 2 are 18
7 times 3 are 21	8 times 3 are 24	9 times 3 are 27
7 times 4 are 28	8 times 4 are 32	9 times 4 are 36
7 times 5 are 35	8 times 5 are 40	9 times 5 are 45
7 times 6 are 42	8 times 6 are 48	9 times 6 are 54
7 times 7 are 49	8 times 7 are 56	9 times 7 are 63
7 times 8 are 56	8 times 8 are 64	9 times 8 are 72
7 times 9 are 63	8 times 9 are 72	9 times 9 are 81
7 times 10 are 70	8 times 10 are 80	9 times 10 are 90
7 times 11 are 77	8 times 11 are 88	9 times 11 are 99
7 times 12 are 84	8 times 12 are 96	9 times 12 are 108

10 times 0 are 0	11 times 0 are 0	12 times 0 are 0
10 times 1 are 10	11 times 1 are 11	12 times 1 are 12
10 times 2 are 20	11 times 2 are 22	12 times 2 are 24
10 times 3 are 30	11 times 3 are 33	12 times 3 are 36
10 times 4 are 40	11 times 4 are 44	12 times 4 are 48
10 times 5 are 50	11 times 5 are 55	12 times 5 are 60
10 times 6 are 60	11 times 6 are 66	12 times 6 are 72
10 times 7 are 70	11 times 7 are 77	12 times 7 are 84
10 times 8 are 80	11 times 8 are 88	12 times 8 are 96
10 times 9 are 90	11 times 9 are 99	12 times 9 are 108
10 times 10 are 100	11 times 10 are 110	12 times 10 are 120
10 times 11 are 110	11 times 11 are 121	12 times 11 are 132
10 times 12 are 120	11 times 12 are 132	12 times 12 are 144

Q. 87. Will you repeat the Table, beginning with 2? with 3? 4? 5? 6? 7? 8? 9? 10? 11? 12?

Q. 88. How many are 2 times 5? 2 times 7? 2 times 12? 4 times 3? 4 times 5? 4 times 7? 4 times 8? 4 times 9? 4 times 10? 4 times 12? 5 times 3? 5 times 4? 5 times 8? 5 times 9? 5 times 12? 6 times 3? 6 times 5? 6 times 7? 7 times 5? 7 times 6? 7 times 9? 7 times 12? 8 times 5? 8 times 9? 8 times 12? 9 times 4? 9 times 7? 10 times 5? 10 times 6? 10 times 11? 12 times 5? 12 times 6? 12 times 12?

Q. 89. How many cents will 10 yards of ribbon? cents for one yard? at 3 cents? 5 cents? cents?

Q. 90. What are 2 barrels of flour worth, if 1 be worth 11 dollars? what are 3 barrels worth? what are 5? what are 7? what are 9? what are 11? what are 12?

Q. 91. What will 7 pairs of shoes come to, at 5 dollars a pair? what will 8 pairs? what will 10 pairs? what will 12 pairs?

Q. 92. What will 9 yards of broadcloth come to, at 6 dollars a yard? at 7 dollars? at 2 dollars?

Q. 93. There are 8 furlongs in one mile; how many are there in 6 miles? in 7 miles? in 9 miles? in 11? in 12?

Q. 94. There are 12 inches in one foot; how many are there in 2 feet? in 5 feet? 6 feet? in 12 feet?

Q. 95. If a man earn 7 dollars in one week, how many dollars will he earn in 2 weeks? in 4? in 6? in 8? in 10? in 11? in 12?

Q. 96. If one bushel of clover-seed cost 12 dollars, what will 2 bushels cost? what will 3 bushels? 5 bushels? 7 bushels? 9 bushels? 11 bushels? 12 bushels?

Q. 97. If you travel 5 miles in one hour, how far can you travel in 2 hours? in 4? in 8? in 10? in 12?

Q. 98. William and James performed a piece of work together in 6 days; how many days will it take William to do the same work alone?

Q. 99. If you pay eight dollars for one quarter's tuition, what will 2 quarters come to? what will 3? 5? 7? 9? 12?

Q. 100. If the interest of one dollar for one year is 6 cents, what is the interest of 2 dollars for the same time? what of 3? of 6? of 8? of 10? of 12?

Q. 101. If you pay 3 dollars for one week's board, what will 2 weeks come to? what will 3? 5? 8? 10? 12?

Q. 102. If you give 5 apples for one orange, how many apples will buy 2 oranges? how many 3? 5? 9? 11?

Q. 103. Will you repeat the Table backwards, beginning with 2 times 12? with 3 times 12? 4 times 12? 5 times 12? 6 times 12? 7 times 12? 8 times 12? 9 times 12? 10 times 12? 11 times 12? 12 times 12?

DIVISION.

equally between 2 boys, and tell me
How many times 2 in 6? Why?
8.

Q. 105. Divide 10 pins equally among 5 boys, and tell me how many each will have. How many times 5 in 10? Why?

Q. 106. If you wish to divide 8 oranges equally between your 2 little sisters, how many would each have? How many times 2 in 8? Why?

Q. 107. A man divides 14 peaches equally among 7 of his children; how many will they have apiece? How many times 7 in 14? Why?

Q. 108. If 14 cents were distributed equally between 2 boys, how many cents would that be for each boy? How many times 2 in 14?

Q. 109. If one orange cost 6 cents, how many oranges will 18 cents buy? How many times 6 in 18?

Q. 110. If it cost 6 cents to go in and see the wax figures, how many times can you go in for 30 cents? How many times 6 in 30?

Q. 111. Eight boys found 48 cents, which they agreed to divide equally among them; how many will each have? How many times 8 in 48? Why?

Q. 112. I sold 8 lead pencils for 80 cents; how much is that apiece? How many times 8 in 80?

Q. 113. 10 men found a pocket-book containing 100 dollars; how many dollars will each have, if the money be equally divided among them? How many times 10 in 100?

Q. 114. There are 4 weeks in a month; how much will a man have a week, that has 48 dollars a month? How many times 4 in 48?

Q. 115. Twelve men, by contract, are to have 96 dollars for performing a piece of work; how many dollars is each man's part? How many times 12 in 96?

Q. 116. There are 4 quarts in a gallon; what is a quart of molasses worth, when a gallon is worth 32 cents? How many times 4 in 32?

Q. 117. An older brother distributed 60 picture-books equally among his 6 younger brothers; how many did each have? How many times 6 in 60? Why?

Q. 118. If 108 cents are divided equally among 9 children, how many will that be apiece? How many times 9 in 108?

Q. 119. If 132 bushels of corn are divided equally among 12 men, how many bushels will each man have? How many times 12 in 132?

Q. 120. Twelve men engage to do a piece of work for 144 dollars; what will be each man's part of the money? How many times 12 in 144? Why?

DIVISION TABLE.

2 in 2, 1 time	3 in 3, 1 time	4 in 4, 1 time
2 in 4, 2 times	3 in 6, 2 times	4 in 8, 2 times
2 in 6, 3 times	3 in 9, 3 times	4 in 12, 3 times
2 in 8, 4 times	3 in 12, 4 times	4 in 16, 4 times
2 in 10, 5 times	3 in 15, 5 times	4 in 20, 5 times
2 in 12, 6 times	3 in 18, 6 times	4 in 24, 6 times
2 in 14, 7 times	3 in 21, 7 times	4 in 28, 7 times
2 in 16, 8 times	3 in 24, 8 times	4 in 32, 8 times
2 in 18, 9 times	3 in 27, 9 times	4 in 36, 9 times
2 in 20, 10 times	3 in 30, 10 times	4 in 40, 10 times
2 in 22, 11 times	3 in 33, 11 times	4 in 44, 11 times
2 in 24, 12 times	3 in 36, 12 times	4 in 48, 12 times
5 in 5, 1 time	6 in 6, 1 time	7 in 7, 1 time
5 in 10, 2 times	6 in 12, 2 times	7 in 14, 2 times
5 in 15, 3 times	6 in 18, 3 times	7 in 21, 3 times
5 in 20, 4 times	6 in 24, 4 times	7 in 28, 4 times
5 in 25, 5 times	6 in 30, 5 times	7 in 35, 5 times
5 in 30, 6 times	6 in 36, 6 times	7 in 42, 6 times
5 in 35, 7 times	6 in 42, 7 times	7 in 49, 7 times
5 in 40, 8 times	6 in 48, 8 times	7 in 56, 8 times
5 in 45, 9 times	6 in 54, 9 times	7 in 63, 9 times
5 in 50, 10 times	6 in 60, 10 times	7 in 70, 10 times
5 in 55, 11 times	6 in 66, 11 times	7 in 77, 11 times
5 in 60, 12 times	6 in 72, 12 times	7 in 84, 12 times
8 in 8, 1 time	9 in 9, 1 time	10 in 10, 1 time
8 in 16, 2 times	9 in 18, 2 times	10 in 20, 2 times
8 in 24, 3 times	9 in 27, 3 times	10 in 30, 3 times
8 in 32, 4 times	9 in 36, 4 times	10 in 40, 4 times
8 in 40, 5 times	9 in 45, 5 times	10 in 50, 5 times
8 in 48, 6 times	9 in 54, 6 times	10 in 60, 6 times
8 in 56, 7 times	9 in 63, 7 times	10 in 70, 7 times
8 in 64, 8 times	9 in 72, 8 times	10 in 80, 8 times
8 in 72, 9 times	9 in 81, 9 times	10 in 90, 9 times
8 in 80, 10 times	9 in 90, 10 times	10 in 100, 10 times
	9 in 99, 11 times	10 in 110, 11 times
	9 in 108, 12 times	10 in 120, 12 times

DIVISION.

11

11 in 11, 1 time	11 in 99, 9 times	12 in 60, 5 times
11 in 22, 2 times	11 in 110, 10 times	12 in 72, 6 times
11 in 33, 3 times	11 in 121, 11 times	12 in 84, 7 times
11 in 44, 4 times	11 in 132, 12 times	12 in 96, 8 times
11 in 55, 5 times	12 in 12, 1 time	12 in 108, 9 times
11 in 66, 6 times	12 in 24, 2 times	12 in 120, 10 times
11 in 77, 7 times	12 in 36, 3 times	12 in 132, 11 times
11 in 88, 8 times	12 in 48, 4 times	12 in 144, 12 times

Q. 121. Will you repeat the Table of Division, beginning with 2? with 3? 4? 5? 6? 7? 8? 9? 10? 11? 12?

Q. 122. How many times 2 in 4? in 6? 8? 10? 12? 16? 20? 24?

Q. 123. How many times 3 in 9? 24? 30? 36?—4 in 8? in 16? 20? 32? 40? 48?—5 in 5? in 30? 40? 50? 60?—6 in 30? in 42? 54? 72?

Q. 124. How many times 8 in 40? in 56? 72? 96?—9 in 27? 45? 63? 81? 108?—10 in 10? 20? 30? 70? 90? 110?—11 in 22? 44? 66? 88? 99? 121?—12 in 12? 36? 48? 60? 84? 96? 120? 144?

Q. 125. If 12 yards of tape cost 24 cents, what will one yard cost?

Q. 126. If you give 2 cents for an apple, how many can you buy for 4 cents? how many for 6 cents? for 10 cents? for 14 cents? for 18 cents? for 20 cents?

Q. 127. If one lead pencil cost 3 cents, how many can you buy for 6 cents? for 9 cents? for 18 cents? for 21 cents? for 24 cents? for 30 cents? for 36 cents?

Q. 128. If 4 cents will buy one orange, how many oranges will 8 cents buy? how many 16 cents? how many 24 cents? how many 32 cents? how many 40 cents? how many 48 cents?

Q. 129. If the stage fare be 5 cents a mile, how far may you be carried for 10 cents? for 15? for 20? for 25? for 30? for 35? for 40? for 50? for 60?

Q. 130. If 6 cents will buy one pine-apple, how many will 12 cents buy? will 24? will 36? will 42? will 48? will 60?

Q. 131. If a small slate cost 7 cents, how many slates will 14 cents buy? will 28? will 35? will 42? will 56? will 63?

Q. 132. If a writing-book cost 8 cents, how many writing-books will 16 cents buy? 24 cents? 40 cents? 56 cents? 80 cents? 96 cents?

Q. 133. How many spelling-books will 18 cents, cost 9 cents? will 27? will 36? will 45? will 54?

Q. 134. How many fish can you buy for 20 cents?

10 cents? how many for 40 cents? for 60 cents? for 100 cents? for 110 cents? for 120 cents?

Q. 135. If you pay 11 cents for an inkstand, how many can you buy for 22 cents? for 33 cents? for 55 cents? for 88 cents? for 110 cents? for 132 cents?

Q. 136. How many pounds of butter can you buy for 24 cents, when the price is 12 cents for one pound? how many pounds for 36 cents? for 60 cents? for 108 cents? for 132 cents? for 144 cents?

Q. 137. Will you now repeat the Table backwards, beginning with 2 in 24? 3 in 36? 4 in 48? 5 in 60? 6 in 72? 7 in 84? 8 in 96? 9 in 108? 10 in 120? 11 in 132? 12 in 144?

FEDERAL MONEY.

TABLE.

10 mills (m.)	make	1 cent,	sign ct.
10 cents	make	1 dime,	sign di.
10 dimes	make	1 dollar,	sign \$.
10 dollars	make	1 eagle,	sign E.

Q. 138. How many mills in 2 cents? 3 cents? 4? 5? 6? 7? 8? 9? 10?

Q. 139. How many cents in 10 mills? in 20 mills? 30 mills? 40 mills? 80 mills? 90 mills? 100 mills? 120 mills?

Q. 140. How many cents in 2 dimes? in 4 dimes? in 5? 6? 7? 8? 10? 11? 12?

Q. 141. How many dimes in 20 cents? in 30 cents? in 40? 50? 70? 90? 120?

Q. 142. How many dimes in 1 dollar? in 3 dollars? in 4? 7? 9? 11? 12?

Q. 143. How many eagles in 20 dollars? in 30? 40? 50? 60? 70? 80? 100? 110? 120?

Q. 144. How many dimes in 10 cents? in 20? 50? 80? 100?
How many dollars in 10 dimes? How many cents in 10 dimes?
- cents, then, in 1 dollar? in 2 dollars? in 3? 4? 5?

in 100 cents? in 200 cents? in 300?

Q. 146. Will you now repeat the Table of Federal Money?

Q. 147. At 2 cents a yard, what will 2 yards of ribbon cost? what will 3 yards cost? 4 yards cost? 5 yards? 8? 10? 12?

Q. 148. How many cents will buy 10 inkstands, at 2 cents apiece? at 3 cents apiece? at 4 cents? at 5? 6? 7? 8? 9? 10? How many dollars are 100 cents?

Q. 149. John gave 50 cents for a book, and 60 cents for a sled; how much did one cost more than the other? How many are 50 from 60? 40 from 50? 20 from 30? 10 from 30? 10 from 40? 10 from 50? 10 from 60? 10 from 80? 10 from 100?

Q. 150. What are coins; as, *cents*, for instance?

A. Pieces of metal stamped.

Q. 151. What do you mean by *stamped*?

A. *Marked*, as in printing.

Q. 152. When do coins become money?

A. When they are stamped by authority, to be used in trading.

Q. 153. What does *federal* mean; as, *Federal States*?

A. *United by agreement*.

Q. 154. What is Federal Money?

A. The coin or money of the United States.

Q. 155. We see that the United States may be called Federal States; but why is our money called Federal Money?

A. Because it was established by the United States.

Q. 156. What do you mean by *established*?

A. *Fixed by law*, or *made lawful*.

Q. 157. By what body of men, and when, was it established?

A. By Congress, A. D. 1786.

Q. 158. What does *denomination* mean; as, cents, mills, &c.?

A. *A name given to, or title*.

Q. 159. What, then, shall we call cents, dollars, &c.?

A. Denominations.

Q. 160. What, then, are denominations?

A. The different names, given to things of different sorts.

Q. 161. What, then, are the denominations of Federal Money?

A. Mills, cents, dimes, dollars, and eagles.

Q. 162. Of what is the eagle made?

A. Of gold.

Q. 163. What is it thence called?

A. The gold coin.

Q. 164. What is its value?

A. Ten dollars.

Q. 165. Of what are the dollar and dime made?

A. Of silver.

Q. 166. What are they thence called?

A. Silver coins.

Q. 167. What is the value of the dollar?

A. Ten dimes, or 100 cents.

Q. 168. What is the value of the dime?

A. Ten cents.

Q. 169. Of what is the cent made?

A. Of copper.

Q. 170. What is it thence called?

A. The copper coin.

Q. 171. What is its value?

A. Ten mills.

Q. 172. Is the mill a real or nominal coin?

A. A nominal one.

Q. 173. What do you mean by *nominal*?

A. *Not real, existing only in name.*

Q. 174. How many are 5 times 6? 6 times 5? 8 times 7? 7 times 8? 9 times 7? 7 times 9? 7 times 6? 11 times 3? 12 times 3? 12 times 4? 12 times 8? 11 times 11? 12 times 9? 12 times 11?

Q. 175. How many times 6 in 60? Why? A. Because 6 times 10 are 60. How many times 5 in 40? Why? 9 in 72? Why? 8 in 56? 7 in 21? 10 in 50? 7 in 42? 7 in 49? 12 in 48? 12 in 132? 12 in 144?

Q. 176. How many are 5 and 10? 10 from 15? 5 from 15? 6 and 18? 6 from 24? 18 from 24? 24 and 8? 8 from 32? 24 from 32? 9 and 18? 18 from 27? 9 from 27? 29 and 9? 9 from 38? 29 from 38? 100 and 8? 8 from 108? 100 from 108? 200 and 6? 6 from 206? 200 from 206? 150 and 10? 10 from 160? 150 from 160?

Q. 177. How many are 4 from 10? from 20? 30? 40? 50? 60? 70? 90? 100? 110? 120?

Q. 178. How many are 8 times 2? 8 times 3? 5? 8? 10? 11? 12?

Q. 179. How many times 6 in 12? in 18? 36? 48? 42? 54? 72? 60? 6? 66?

Q. 180. How many are 7 and 9? 17 and 9? 47 and 9? 37 and 9? 7 and 5? 37 and 5? 57 and 5? 67 and 5? 97 and 5? 8 and 7? 18 and 7? 38 and 7? 48 and 7? 78 and 7? 28 and 7? 98 and 7? 9 and 9? 19 and 9? 39 and 9? 49 and 9? 69 and 9? 89 and 9? 6 and 6? 16 and 6? 26 and 6? 46 and 6? 66 and 6? 86 and 6? 96 and 6? 106 and 6? 116 and 6? 126 and 6? 136 and 6? 146 and 6? 156 and 6? 166 and 6? 176 and 6? 186 and 6? 196 and 6?

Q. 181. The following Table is added, thus : 1 and 2 are 3; 1 and 2 are 3, and 3 are 6; beginning with the 1 on the left each time. Will you now repeat it?

TABLE.

1	2	.	.	.	.	.	.	..	..	..	.....	A.	3
1	2	3	.	.	.	.	.	..	..	..	.....	A.	6
1	2	3	4	.	.	.	.	..	..	..	.....	A.	10
1	2	3	4	5	.	.	.	..	..	..	.....	A.	15
1	2	3	4	5	6	.	.	..	..	..	.....	A.	21
1	2	3	4	5	6	7	.	..	..	..	.....	A.	28
1	2	3	4	5	6	7	8	.	..	..	.....	A.	36
1	2	3	4	5	6	7	8	9	..	..	.....	A.	45
1	2	3	4	5	6	7	8	9	10	..	.....	A.	55
1	2	3	4	5	6	7	8	9	10	11	..	A.	66
1	2	3	4	5	6	7	8	9	10	11	12	A.	78

WINE MEASURE.

Used in measuring wine, brandy, spirits, vinegar, oil, cider, honey, &c.

TABLE.

4	gills (gi.)	make	1	pint,	sign	pt.
2	pints	make	1	quart,	sign	qt.
4	quarts	make	1	gallon,	sign	gal.
31½	gallons	make	1	barrel,	sign	bl.
42	gallons	make	1	tierce,	sign	tier.
63	gallons	make	1	hogshead,	sign	hhd.
84	gallons	make	1	puncheon,	sign	pun.
2	hogsheads	make	1	pipe, or butt,	sign	p.
2	pipes	make	1	tun,	sign	T.

Q. 183. Will you repeat the Table?

Q. 184. How many gills in 1 pint? in 2? 3? 4? 5? 6? 7?
8? 9? 10? 11? 12? 20? 100?

Q. 185. How many pints in 4 gills? in 8? 16? 24? 32?
44? 80? 400?

Q. 186. At one cent a pint, what will 2 pints cost? 1
cost? 2 quarts? 3? 5? 7? 9? 10? 12? 20? 100?

Q. 187. At two cents a gill, what will 4 gills cost? 1 pint cost? 2 pints? 3? 4? 6? 8? 10? 12?

Q. 188. How many pints in 2 quarts? in 4? 8? 10? 12? 15? 20? 30? 40? 50? 100? 200? 400?

Q. 189. How many quarts in 4 pints? in 8? 16? 20? 24? 30? 40? 60? 80? 100? 200? 400? 800?

Q. 190. How many halves will one apple make?

Q. 191. How many thirds will one apple make?

Q. 192. How many quarters will one apple make?

Q. 193. How many fifths will one apple make?

Q. 194. How many sixths will one apple make?

Q. 195. How many sevenths will one apple make?

Q. 196. How many eighths will one apple make?

Q. 197. How many ninths will one apple make?

Q. 198. How many tenths will one apple make?

Q. 199. When an apple is divided into two equal parts, what is one part called? *A.* One half.

Q. 200. When an apple, or any thing, is divided into three equal parts, what is one part called? *A.* One third. What are two parts called? *A.* Two thirds.

Q. 201. When any one thing is divided into four equal parts, what is one part called? *A.* One quarter, or one fourth. What are three parts called? *A.* Three quarters, or three fourths.

Q. 202. When any single thing is divided into five equal parts, what is one part called? *A.* One fifth. What are two parts called? *A.* 2 fifths. What are three parts called? four parts called?

Q. 203. When a single thing is divided into six equal parts, what is one part called? *A.* 1 sixth. What are two parts called? *A.* 2 sixths. Three parts called? four parts called? five parts called?

Q. 204. When an apple is divided into eight equal parts, what is one part called? *A.* 1 eighth. What are two parts called? three parts called? four parts called? five parts called? seven parts called? eight parts called? Into how many parts is the apple divided? *A.* Eight. How many eighths, then, make one whole apple? If 8 eighths make one whole, how many eighths will make two wholes? *A.* 16 eighths. How many eighths will make three wholes? [24 eighths.] Four wholes? [32 eighths.] Five wholes? [40 eighths.] Eight wholes? [64 eighths.] How many wholes in 8 eighths? in 16 eighths? 32 eighths.

Q. 205. When a single thing is divided into halves, how will it take to make one whole? two wholes? three? four? five? six? ten? How many wholes, then, are 2? 6? 10 halves? 20 halves? Why are 2 halves the whole is divided into two equal

∴ Q. 206. How many thirds in one whole? Why are 3 thirds the whole? A. Because the whole is divided into three equal parts. How many quarters in one whole? Why are 4 quarters the whole? How many fifths in one whole? Why are 5 fifths the whole? How many sixths in one whole? Why are 6 sixths the whole? How many tenths in one whole? Why are 10 tenths the whole? How many fifteenths in one whole? Why are 15 fifteenths the whole? How many thirtieths in one whole? Why are 30 thirtieths the whole?

Q. 207. If $\frac{1}{2}$ half of an apple cost one cent, what will a whole one cost? what will 2 wholes cost? 3 wholes? 4? 5? 8? 10? 20?

Q. 208. If $\frac{1}{3}$ third of an apple cost 1 cent, what will 2 thirds cost? what will 3 thirds cost? a whole cost? 2 wholes cost? 3 wholes? 6? 8? 10? 12? 20? 100?

Q. 209. If $\frac{1}{4}$ fourth of an orange cost one cent, what will a whole one cost? 2 wholes cost? 5 wholes?

Q. 210. If $\frac{1}{4}$ fourth of a factory is worth 100 dollars, what is the whole factory worth?

Q. 211. If $\frac{1}{5}$ fifth part of a pie cost 2 cents, what will 2 fifths cost? 3 fifths cost? 4 fifths cost? 5 fifths cost? 1 pie cost? 2 pies? 3? 5? 7? 9? 10? 12?

Q. 212. If $\frac{1}{5}$ fifth part of a boat cost 10 dollars, what will 2 fifths cost? 3 fifths cost? 4 fifths? 5 fifths? the boat cost? two boats cost?

Q. 213. At one dollar a gallon, what will 2 gallons cost? 3 gallons cost? 4 gallons? 10? 30? $31\frac{1}{2}$? [A. $31\frac{1}{2}$ dollars.] what will 1 barrel cost? 42 gallons cost? 1 tierce cost? 63 gallons cost? 1 hogshead cost? $\frac{1}{60}$ sixty-third part of a hogshead, or 1 gallon, cost? 2 sixty-thirds? 8 sixty-thirds? 30 sixty-thirds? 63 sixty-thirds? 1 hogshead?

Q. 214. What is one pipe of wine worth, when a hogshead is worth 100 dollars? what are 2 pipes worth? 3 pipes? 4 pipes?

Q. 215. How many tuns in 4 pipes? in 6? 8? 10? 12? 20? 40? 200?

Q. 216. What does *denomination* mean? (159.)*

Q. 217. What are denominations? (160.)*

Q. 218. What are the denominations of Wine Measure?

A. Gills, pints, quarts, gallons, barrels, tierces, hogsheads, puncheons, pipes, and tuns.

Q. 219. For what is this measure used?†

Q. 220. Will you repeat the Table of Federal Money backwards, beginning with 1 eagle is 10 dollars?

Q. 221. Will you repeat the Table of Wine Measure backwards?

* Refer back to this number.

† See the sentence before

Q. 222. At one cent apiece, how many dollars will it take to buy 100 apples? 200 apples? 300 apples? 400? 500? 600? 900?

BEER MEASURE.

Used in measuring ale, beer, and milk.

TABLE.

2 pints (pt.)	make	1 quart,	sign qt.
4 quarts	make	1 gallon,	sign gal.
8 gallons	make	1 firkin of ale, . .	sign fir.
9 gallons	make	1 firkin of beer, .	sign fir.
2 firkins	make	1 kilderkin, . . .	sign kil.
2 kilderkins	make	1 barrel,	sign bar.
36 gallons	make	1 barrel,	sign bar.
54 gallons	make	1 hogshead, . . .	sign hhd.

Q. 222. Will you repeat the Table?

Q. 223. How many pints in 2 quarts? in 4? 8? 10? 15? 30? 40? 100? 200?

Q. 224. How many quarts in 2 gallons? in 8? 10? 12? 20? 100? 200?

Q. 225. What will one quart of milk cost, at 2 cents a pint? what will 2 quarts? 6? 10? 12?

Q. 226. When ale is one dollar a gallon, what is 1 firkin worth? 2 firkins worth? 4? 8? 12? 1 barrel? 1 hogshead?

Q. 227. What are the denominations of this measure?

A. Pints, quarts, gallons, firkins, kilderkins, barrels, and hogsheads.

Q. 228. For what purpose is this measure used?*

Q. 229. Will you repeat the Table backwards? the Table of Wine Measure forwards, then backwards?

Q. 230. Will you repeat the Multiplication Table backwards, *beginning with 2 times 12; 3 times 12; 4 times 12; 5 times 12; 6 times 12; 7 times 12; 8 times 12; 9 times 12; 10 times 12?*

Q. 231. Will you repeat the Division Table backwards, beginning with 2 in 24; 3 in 36; 4 in 48; 5 in 60; 6 in 72; 7 in 84; 8 in 96; 9 in 108; 10 in 120; 11 in 132; 12 in 144?

Q. 232. How many times 2 in 4? how many *twos*, then, in 4? *twos* in 6? *twos* in 8? *twos* in 12? times 3 in 6? *threes* in 6? *threes* in 9? *threes* in 18? *threes* in 24? *fours* in 8? *fours* in 24? 4s in 32? 6s in 12? 6s in 30? 6s in 72? 8s in 96? 9s in 72? 10s in 100? 11s in 33? 11s in 132? 12s in 60? 12s in 144?

Q. 233. How many are 2 times 3? how many 2s in 6? how many 2s, then, in 2 times 3? 2s in 2 times 4? 2s in 3 times 4? in 4 times 4? in 4 times 5?

Q. 234. Two *threes* are how many? how many times 6 in 6? 2 *threes*, then, are how many 6s? how many 2s? how many 1s?

Q. 235. Four *threes* are how many 2s? 3s? 4s? 6s?

Q. 236. Three *fours* are how many 2s? 3s? 4s? 6s? 1s? 12s?

Q. 237. Four *sizes* are how many 24s? 12s? 8s? 6s? 4s? 2s? 1s? 8 *fives* are how many 10s? 40s? 20s? 5s? 2s? 1s?

Q. 238. How many days shall I be in drinking one quart of ale, if I drink one pint a day? how many days in drinking 2 quarts? 3 quarts? 5 quarts? 8 quarts? 10 quarts? 20 quarts? 100 quarts?

Q. 239. If 2 dollars will pay for one dictionary, how many dollars will pay for 4? 8? 16? 20?

Q. 240. If I pay 4 dollars for one hat, how many can I buy for 8 dollars? 40 dollars? 44 dollars? 48 dollars?

Q. 241. How many are 10 and 5?

Q. 242. How, then, can you add 15 to 25?

A. 25 and 10 are 35, and 5 are 40.

Q. 243. How many are 35 and 15? 45 and 15? 65 and 15? 85 and 15? 10 and 8?

Q. 244. How many are 27 and 18?

A. 27 and 10 are 37, and 8 are 45.

Q. 245. How many are 37 and 18? 57 and 18? 47 and 18? 67 and 18? 87 and 18? 77 and 18?

Q. 246. How many are 10 and 4? 24 and 14? 44 and 14? 34 and 14? 54 and 14? 64 and 14? 54 and 14? 74 and 14? 10 and 3? 27 and 13? 23 and 13? 43 and 14? 64 and 14?

Q. 247. How many are 1 and 2? 3 and 3? 6 and 4? 10 and 5? 15 and 6? 21 and 7? 28 and 8? 36 and 9? 45 and 10? 55 and 11? 66 and 12? 78 and 13? 91 and 14? 105 and 15? 120 and 16? 136 and 17? 153 and 18? 171 and 19? 190 and 20?

Q. 248. Will you add the following Table

TABLE.

1	2	3	4	5	6	7	8	9	10	..	..	..	..	..	..	..	..	..	..	A.	55
1	2	3	4	5	6	7	8	9	10	11	..	..	..	..	..	..	..	..	..	A.	66
1	2	3	4	5	6	7	8	9	10	11	12	..	..	..	..	..	..	..	..	A.	78
1	2	3	4	5	6	7	8	9	10	11	12	13	..	..	..	..	..	..	..	A.	91
1	2	3	4	5	6	7	8	9	10	11	12	13	14	..	..	..	..	..	..	A.	105
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	..	..	..	..	..	A.	120
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	..	..	..	..	A.	136
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	..	..	..	A.	153
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	..	..	A.	171
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..	A.	190
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	A.	210

DRY MEASURE.

Used in measuring grain, salt, fruit, coal, &c.

TABLE.

2 pints (pt.)	make	1 quart,	sign	qt.
8 quarts.	make	1 peck,	sign	pk.
4 pecks	make	1 bushel,	sign	bu.
36 bushels	make	1 chaldron,	sign	ch.

Q. 249. Will you repeat the Table?

Q. 250. How many pints in 4 quarts? in 6? 8? 12? 20?
100? 200? 300? 400? quarts in 2 pecks? in 3? 4? 6? 5? 8?
7? 11? 10? 12? 100?

Q. 251. How many pecks in 16 quarts? in 24? 32? 48? 64?
40? 56? 88? 72? 96? bushels in 8 pecks? in 12? 20? 16?
24? 36? 28? 44? 40? 48?

Q. 252. At 5 cents a quart for flaxseed, what will 3 quarts
cost? will 4? 2? 6? 5? 9? 7? 12? 10? 11? 8? 1 peck? 2
of a peck? [1 eighth is 1 quart.—A. 5 cents.]
1 eighths? 3 eighths? 6 eighths? 5 eighths?
6 eighths? 2 pecks? what will 10 cents
buy? 40 buy? 25? What part of a pe-
ck will 10 cents buy? 20 cents

Q. 253. At 10 cents a peck, what will one bushel of salt cost? what will one half of a bushel? three quarters of a bushel? four quarters of a bushel? 1 bushel? 2 bushels?

Q. 254. What are the denominations of this measure?

A. Pints, quarts, pecks, bushels, and chaldrons.

Q. 255. For what purposes is this measure used?

Q. 256. How many quarters will one whole apple make?
How many apples will four quarters make? will 8 quarters?
12 quarters make? will 16 quarters? 20 quarters? 24 quarters?
36 quarters? 48 quarters?

Q. 257. How many wholes in 4 quarters? in 8 quarters? 12 quarters? 16 quarters? 32 quarters?

Q. 258. How many wholes in 2 halves? 3 thirds? 4 halves? 6 thirds? 9 thirds? 12 thirds? 16 halves? 16 quarters? 5 fifths? 10 fifths? 40 fifths? 6 sixths? 18 sixths? 30 sixths?

Q. 259. How many wholes in 7 sevenths? 14 sevenths? 8 eighths? 16 eighths? 9 ninths? 18 ninths? 24 twelfths? 16 sixteenths? 20 tenths? 40 tenths?

Q. 260. How many wholes in 60 sixths? 60 fifths? 60 fourths? 60 thirds? 60 halves?

Q. 261. How many halves in 30? thirds in 20? quarters in 15? fifths in 12? sixths in 10?

Q. 262. Will you repeat the Division Table backwards, beginning with 2 in 24; 3 in 36; 4 in 48; 5 in 60; 6 in 72; 7 in 84; 8 in 96; 9 in 108; 10 in 120; 11 in 132; 12 in 144;

Q. 263. Will you repeat the Table of Federal Money? Wine Measure? Ale or Beer Measure? Dry Measure, backwards?

Q. 264. Will you repeat the following Table?

TABLE.

2	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A.	5
2	3	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A.	9
2	3	4	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A.	14
2	3	4	5	6	.	.	.	.	.	.	.	.	.	.	.	.	.	A.	20
2	3	4	5	6	7	.	.	.	.	.	.	.	.	.	.	.	.	A.	27
2	3	4	5	6	7	8	.	.	.	.	.	.	.	.	.	.	.	A.	35
2	3	4	5	6	7	8	9	.	.	.	.	.	.	.	.	.	.	A.	44
2	3	4	5	6	7	8	9	10	.	.	.	.	.	.	.	.	.	A.	54
2	3	4	5	6	7	8	9	10	11	.	.	.	.	.	.	.	.	A.	65
2	3	4	5	6	7	8	9	10	11	12	.	.	.	.	.	.	.	A.	77
2	3	4	5	6	7	8	9	10	11	12	13	.	.	.	.	.	.	A.	90
2	3	4	5	6	7	8	9	10	11	12	13	14	.	.	.	.	.	A.	104
2	3	4	5	6	7	8	9	10	11	12	13	14	15	.	.	.	.	A.	119
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	.	.	.	A.	135		
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	.	.	A.	152		
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	.	A.	170		
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	.	A.	189	
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	.	A.	209

CLOTH MEASURE.

Used in measuring goods sold by the yard or ell.

TABLE.

2 $\frac{1}{4}$ inches (in.)	make	1 nail,	sign	na.
4 nails	make	1 quarter,	sign	qr.
4 quarters	make	1 yard,	sign	yd.
3 quarters	make	1 Ell Flemish,	sign	E. Fl.
5 quarters	make	1 Ell English,	sign	E. E.
6 quarters	make	1 Ell French,	sign	E. Fr.

Q. 265. Will you repeat the Table?

Q. 266. How many nails in 2 quarters? in 3? 5? 4? 7? 6?
10? 8? 20? 100?

Q. 267. How many quarters in 2 yards? in 5? 4? 8? 7?
10? 9? 12? 11? 2 Flemish ells? in 3? 8? 10? 12? 2 Eng-
lish ells? in 4? 6? 10? 12?

Q. 268. How many yards in 4 quarters? in 8? 12? 28? 20?
48?

Q. 269. If 1 sixth of a yard of cloth cost 2 cents, what will
2 sixths cost? 4 sixths? 6 sixths? 1 yard? 7 sixths, or 1 and
1 sixth? 1 and 2 sixths? 1 and 3 sixths? 1 and 6 sixths? 2
yards? 6 sixths? 7 sixths? 9 sixths? 12 sixths?

Q. 270. How many wholes in 5 fifths? in 6 fifths? [1 and 1
fifth.] in 7 fifths? 9 fifths? 10 fifths? 11 fifths? 13 fifths? 26
fifths?

Q. 271. How many fifths in one whole? [5] in 1 and 1
fifth? [6.] in 1 and 2 fifths? 1 and 4 fifths? 1 and 5 fifths?

Q. 272. How many fifths in one whole? quarters in 3
wholes? in 3 and 1 fourth? 4 and 1 fourth? halves in 8
wholes? in 8 and 1 half? thirds in 5 wholes? in 5 and 1 third?
5 and 2 thirds? 6 and 2 thirds? fifths in 5 wholes? in 5 and 3
fifths? 5 and 4 fifths? 5 and 5 fifths? sevenths in 2 wholes?
in 2 and 1 seventh? 2 and 5 sevenths? eighths in 3 wholes?
3 and 1 eighth? 3 and 5 eighths? 4 and 6 eighths? tenths in
2 and 1 tenth? 3 and 1 tenth? 5 and 2 tenths?

3. How many wholes in 2 halves? 3 halves? 1
4 thirds? 6 fifths? 13 fifths? 13 sixths?
18 eighths? 19 ninths? 25 tenths?
4 twelfths? 145 twelfths? 146 twel-
fths?

Q. 274. Eight *threes* are how many 24s? how many 12s?
8s? 6s? 4s? 3s? 2s?

Q. 278. Twelve *fives* are how many times 30? 12? 5? 2?
1?

Q. 279. What are the denominations of this measure?

A. Inches, nails, quarters, yards, and ells.

Q. 280. What is the use of this measure?

Q. 281. Will you repeat the Table of Dry Measure backwards? will you repeat the Table beginning with 1? (181.) the Table beginning with 2? (264.)

Q. 282. Will you repeat the following Table?

TABLE.

3	4	5	6	7	8	9	10	..	..	..	..	..	..	..	..	..	..	A.	52
3	4	5	6	7	8	9	10	11	..	..	..	..	..	..	..	..	..	A.	63
3	4	5	6	7	8	9	10	11	12	..	..	..	..	..	..	..	..	A.	75
3	4	5	6	7	8	9	10	11	12	13	..	..	..	..	..	..	..	A.	88
3	4	5	6	7	8	9	10	11	12	13	14	..	..	..	..	..	..	A.	102
3	4	5	6	7	8	9	10	11	12	13	14	15	..	..	..	..	..	A.	117
3	4	5	6	7	8	9	10	11	12	13	14	15	16	..	..	..	..	A.	133
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	..	..	..	A.	150
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	..	..	A.	168
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	..	A.	187
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	A.	207

TROY WEIGHT.

Used in weighing gold, silver, coin, jewels, bread, and liquors.

TABLE.

24 grains (gr.) . . . make . . . 1 pennyweight, sign dwt.

20 pennyweights . . . make . . . 1 ounce, . . . sign oz.

12 ounces make . . . 1 pound, . . . sign lb.

Q. 283. Will you repeat the Table?

Q. 284. How many pennyweights in 2 ounces? in 3? 4?
5?

Q. 285. How many pounds in 12 ounces? in 24? 48?
60? 13? [and 1 twelfth.] in 14? 15? 17? 19? 21? 23?
37? 49? 50? 62? 87? 100? 150?

Q. 256. When quills are one cent apiece, how many dollars will buy 100? buy 300? 250? 500? 400? 500?

Q. 257. How many gallons in 8 quarts? in 9? [2 and 1 fourth.] in 10? 12? 13? 16? 17? 21?

Q. 258. How many pints in five gills? [1 pint and 1 gill.] in 6 gills? in 7? 8? 13? 17? 19? 21? 30? 50?

Q. 259. What will one barrel of brandy cost, at one dollar a gallon? one tierce cost? one hogshead cost?

Q. 260. Will you repeat the Table of Wine Measure? Ale or Beer Measure? Cloth Measure? Dry Measure? Troy Weight, backwards?

Q. 261. How many times 8 in 8? 8 in 9? [1 and 1 eighth.] 8 in 10? 8 in 11? 8 in 16? 8 in 17? 8 in 18? 8 in 19? 8 in 20? 5 in 6? [1 and 1 fifth.] 5 in 7? 5 in 11? 5 in 17? 5 in 28? 5 in 44? 5 in 63? 10 in 11? [1 and 1 tenth.] 10 in 21? 10 in 31? 10 in 51? 10 in 62? 10 in 73? 10 in 84? 10 in 95? 10 in 106? 10 in 117? 10 in 128?

Q. 262. What are the denominations of Troy Weight?

A. Grains, pennyweights, ounces, and pounds.

Q. 263. What is the use of this weight?

Q. 264. How many times 7 in 14? 2 times 7 are how many? 7 in 84? 12 times 7? 12 in 36? 3 times 12? 5 times 12? 12 in 60? 5 in 60? 11 times 12? 12 times 11? 11 in 132? 12 in 132? 12 times 12? 12 in 144? 7 in 56? 7 times 8? 8 in 56? 8 times 7? 9 in 108? 9 times 12? 12 in 108? 12 times 9? 6 times 7? 6 in 42? 7 times 6? 7 in 42? 11 times 11?

Q. 265. Will you repeat the following Table of Eights?

TABLE.

8	in	8,	1	time;	then,	8	times	1	are	8
8	in	16,	2	times;	then,	8	times	2	are	16
8	in	24,	3	times;	then,	8	times	3	are	24
8	in	32,	4	times;	then,	8	times	4	are	32
8	in	40,	5	times;	then,	8	times	5	are	40
8	in	48,	6	times;	then,	8	times	6	are	48
8	in	56,	7	times;	then,	8	times	7	are	56
8	in	64,	8	times;	then,	8	times	8	are	64
8	in	72,	9	times;	then,	8	times	9	are	72
		80,	10	times;	then,	8	times	10	are	80
		88,	11	times;	then,	8	times	11	are	88
					then,	8	times	12	are	96

AVOIRDUPOIS WEIGHT.

Used in weighing all coarse goods, which are liable to waste; as flour, hay, groceries, tallow, &c., and all metals, except gold and silver.

TABLE.

16 drams (dr.)	make	1 ounce,	sign	oz.
16 ounces	make	1 pound,	sign	lb.
28 pounds	make	1 quarter,	sign	qr.
4 quarters	make	1 hundred weight,	sign	cwt.
20 hundred weight	make	1 ton,	sign	T.

Q. 296. Will you repeat the Table?

Q. 297. How many ounces in 2 pounds? in 3? pounds in 17 ounces? [1 pound and 1 ounce.] in 18 ounces? in 20? 22? 24? 23? 25? 28?

Q. 298. How many quarters in 1 hundred weight? in 2? 5? 8? 6? 10? 9? 12? 20?

Q. 299. At a dollar a hundred weight, what will 1 ton of hay cost? will 1 and 1 twentieth? [21.] will 1 and 2 twentieths? 1 and 10 twentieths? 2 tons? 2 and 10 twentieths? 3? 3 and 1 twentieth? 4 and 10 twentieths? 5?

Q. 300. How many drams in one ounce? in 1 and 1 sixteenth? [17.] in 1 and 2 sixteenths? in 1 and 5 sixteenths? 1 and 10 sixteenths? 1 and 4 sixteenths?

Q. 301. Ten *sizes* are how many 30s? how many 20s? 10s? 5s? 1s? 60s?

Q. 302. How many are 9 and 9? 39 and 9? 59 and 9? 69 and 9? 89 and 9? 8 and 8? 28 and 8? 58 and 8? 10 and 5? 25 and 15? 7 and 7? 27 and 7? 47 and 7? 67 and 7? 46 and 6? 66 and 6? 86 and 6? 106 and 6? 116 and 6? 146 and 6?

Q. 303. How many mills in 2 cents and 1 tenth? [21.] in 3 and 1 tenth? 4 and 1 tenth? 5 and 2 tenths? 6 and 3 tenths?

Q. 304. How many cents in 21 mills? [2 and 1 mill.] in 31 mills? in 41? 52? 63? 75? 80? 100?

Q. 305. How many pints in 9 gills? [2 and 1 gill.] in 18? 19? quarts in 2 gallons and 1 quarter? [9.] in 2 and 3 quarters? 6 and 1 quarter? barrels in 31 gallons and 1 half? tierces in 42 gallons? in 43? [1 and 1 gallon.] in 45? 48? hogsheads in 64 gallons? [1 and 1 gallon.] in 65? pipes in 2 tons? 2 and 1 half? [5.] in 5 tons?

Q. 306. How many inches in 1 nail? quarters in 5? nails? yards in 5 quarters? in 9? 10? 12? Flemish? 6 quarters? in 7? 9? French ells in 13 quarters? 14

Q. 307. How many bushels in 8 pecks? in 9? in

Q. 308. What will 2 pounds of butter cost, at 10 cents a pound? what will 3 pounds? 5 pounds?

Q. 309. Will you repeat the Table beginning with 1 and 2? (181.*) the Table beginning with 2? (264.) that beginning with 3? (282.) Table of Federal Money? Wine Measure? Troy Weight? Avoirdupois Weight, backwards?

Q. 310. John, having an apple, divided it equally among his four little brothers; what part did he give to each?

Q. 311. Thomas, having an orange, divided it among his playmates, by giving one third to each; how many playmates had he? If he had given one fifth to each, how many would there have been? 1 sixth to each, how many? 2 sixths, how many? 3 sixths, how many? 1 seventh, how many? 1 eighth, how many? 2 eighths, how many? 4 eighths, how many? 8 eighths, how many?

Q. 312. If 1 inkstand cost 1 third of a cent, what will 2 cost? 2 times 1 third is how much, then? *A.* 2 thirds.

Q. 313. John received as a present from each one of his older brothers, one eighth of a dollar. When counting his money, he found he had exactly one dollar. How many older brothers had he?

Q. 314. Thomas bought two books; for one he gave 1 eighth of a dollar, and for the other 9 times as much; how many eighths did he pay for the more costly one? How many eighths make one whole? How many wholes, then, are 9 eighths? [1 and 1 eighth.]

Q. 315. How many thirds or wholes in 3 times 1 third? Wholes in 4 times 1 third? Wholes in 8 times 1 third? Wholes in 4 times 2 thirds? Wholes in 5 times 2 thirds? Wholes in 5 times 1 fourth? Wholes in 6 times 3 fifths?

APOTHECARIES' WEIGHT.

Used by apothecaries in mixing their medicines, but in selling them they use avoirdupois.

TABLE.

20 grains (gr.) . . .	make . . .	1 scruple, . . .	sign \mathfrak{S} .
scruples . . .	make . . .	1 dram, . . .	sign \mathfrak{d} .
grains . . .	make . . .	1 ounce, . . .	sign \mathfrak{z} .
	make . . .	1 pound, . . .	sign \mathfrak{lb} .

Spaces always denote a reference back to the

Q. 316. Will you repeat the Table?

Q. 317. How many grains in 2 scruples? in 3? 4? 5? 6?

Q. 318. How many drams in 6 scruples? in 6 and 1 sixth?
7? 12?

Q. 319. How many drams in 2 ounces? in 2 and 1 eighth?
3 and 1 eighth? 4 and 2 eighths? 5 and 3 eighths? 7 and 1
eighth?

Q. 320. How many pounds in 12 ounces? in 13? 15? 16?
24? 37? 49? 60?

Q. 321. How many halves in 2 wholes? in 3? 5? thirds in
2 wholes? in 3? 5? 8? quarters in 5 wholes? sixths in 6
wholes? sevenths in 10 wholes? eighths in 12 wholes? twen-
tieths in 3 wholes?

Q. 322. How many thirds in one whole? in 1 and 1 third?
4ths in 4 and 1 fourth? 5ths in 2 and 2 fifths? 7ths in 8 and 2
sevenths? 9ths in 1 and 2 ninths? 10ths in 10 and 5 tenths?

Q. 323. How many pounds are 25 ounces? [2 and 1 ounce.]
in 37 ounces? in 50? 60? 65? 84? 86? 110?

Q. 324. How many ounces in 2 pounds and 1 ounce? in 2
pounds and 3 ounces? in 3 pounds and 2 ounces? 4 pounds
and 5 ounces? 6 pounds and 8 ounces?

Q. 325. What are the denominations of this weight?

A. Grains, scruples, drams, ounces, and pounds.

Q. 326. What use is made of this measure?

Q. 327. Which weight do apothecaries use in selling their
medicines?

Q. 328. Will you repeat this Table backwards? the Table of
Troy Weight backwards? Avoirdupois Weight backwards?
Dry Measure backwards?

Q. 329. John, having 4 apples, divided them equally among 4
boys; how many did he give to each? 4 in 4, how many then?
1 apple among 4 boys, how much apiece? [1 fourth.] 4 in 1,
how much? 4 times 1 fourth how many? [4 fourths, or 1.] 1
apple among 5 boys, how much apiece? [1 fifth.] 5 in 1, how
much, then? 5 times 1 fifth, how many? [5 fifths, or 1.] 1 apple
among 8 boys, how much? [1 eighth.] 8 in 1, how much, then?
8 times 1 eighth, how many? [8 eighths, or 1.] 2 apples among 8
boys, how much? [2 eighths.] 8 in 2, how much, then? [2
eighths.] 8 times 2 eighths, how many? [16 eighths, or 2.] 8
apples among 3 boys, how much? [3 eighths.] 8 in 3, then? 8
times 3 eighths? [24 eighths, or 3.] 8 in 4? 8 times 4 eighths?
[32 eighths, or 4.] 8 in 5? [5 eighths.] 8 times 5 eighths? 8 in 6?
8 times 6 eighths? 8 in 7? 8 times 7 eighths?

STERLING MONEY.

Used principally in England and her territories, and partially in the United States.

TABLE.

4 farthings (qr.) . . .	make . . .	1 penny,	sign d
12 pence	make . . .	1 shilling, . . .	sign s
20 shillings	make . . .	1 pound,	sign £

Q. 331. Will you repeat the Table?

Q. 332. How many farthings in 2 pence? in 4? 8? 10? 12? 2 pence and 1 farthing? in 3 pence and 2 farthings? in 1 penny? in 1 and 1 fourth? in 1 and 1 half? 4? 4 and 1 half? 6?

Q. 333. How many shillings in 12 pence? 13 pence? 14 pence? in 20? 25? 48? 49? 30?

Q. 334. How many shillings in 1 pound? in 1 and 1 twentieth? [1 twentieth is 1 shilling. *A.* 21.] in 1 and 2 twentieths? in 1 and 5 twentieths? in 2 pounds? in 3 and 1 twentieth? 5 and 1 twentieth?

Q. 335. How many halves in 2? in 2 and 1 half? thirds in 3 and 1 third? quarters in 4 and 1 fourth? fifths in 5 and 3 fifths? sixths in 6 and 4 sixths?

Q. 336. How many farthings in 1 penny? in 1 half a penny? in 1 fourth? in 3 fourths?

Q. 337. What are the denominations of Sterling Money?

A. Farthings, pence, shillings and pounds.

Q. 338. Why is Sterling Money so called?

A. From *Easterlings*, who were at first employed in coining it.

Q. 339. What does *coining* mean?

A. The making of money.

Q. 340. By whom is Sterling Money principally used?

A. By the English.

Q. 341. Is it ever used in the United States?

A. Partially, much less than formerly.

Q. 342. What money is in general circulation in this country?

A. Federal Money.

Q. 343. What is that? (154.)

Q. 344. What are the American coins?

A. Eagles, half eagles, dollars, half dollars, twenty-five-cent pieces or quarters, ten-cent pieces or dimes, five-cent pieces, and cents.

Q. 345. What are the English gold coins?

A. Sovereigns and guineas.

Q. 346. What are their silver coins?

A. Crown pieces, shilling pieces, and formerly penny pieces

- Q. 347. What are the English copper coins?
 A. Farthing pieces.
- Q. 348. What is the value of a sovereign in our money?
 A. 4 dollars and 55 cents.
- Q. 349. What is the value of the guinea?
 A. 4 dollars and 75 cents.
- Q. 350. What is the value of the crown?
 A. 1 dollar and 15 cents.
- Q. 351. What is the value of the shilling?
 A. 23 cents.
- Q. 352. What is the value of the farthing?
 A. Not quite half a cent.
- Q. 353. What small foreign coins are there which are in very general use among us?
 A. The Spanish 12½-cent piece, and the 6½-cent piece?
- Q. 354. What is the 12½-cent piece called in New England?
 A. Ninepence.
- Q. 355. What is the 6½-cent piece called?
 A. Fourpence-halfpenny, or fourpence.
- Q. 356. What does New England comprise?
 A. The states of Maine, New Hampshire, Vermont, Rhode Island, Massachusetts and Connecticut.
- Q. 357. What is the 12½-cent piece called in New York and some other states?
 A. A shilling piece.
- Q. 358. What is the 6½-cent piece called?
 A. Sixpence.
- Q. 359. What is the 12½-cent piece called in Pennsylvania and some other states?
 A. Elevenpence, or 'levenpenny bit, or *levy*.
- Q. 360. What is the 6½-cent piece called?
 A. Fivepence, or *fippenny* bit, or *fip*.
- Q. 361. When a boy from New England goes to New York, what will his ninepences and fourpences be called there? If he should go to Philadelphia, what would they be called there? If he should bring away with him levies, New York shillings, and fips, what would they pass for in his own town?
- Q. 362. What, now, appears to be the different names in our country for the 12½-cent bits?
 A. Ninepences, 'levenpenny pieces, or levies, and shilling pieces.
- Q. 363. What are the different names for the 6½-cent pieces?
 A. Fourpence-halfpennies, or fourpences, sixpences, and fips, or fippenny bits.
- Q. 364. How many cents are 2 fourpences? [12½.] How many are 3 fips? [18½.] How many are 4 York sixpences? [25.] 5 fourpences? [31½.] 6 fips? [37½.] 7 sixpences? [43½.] 8 fourpence-halfpennies? [50.] 9 fippennies? [56½.] 10 pences? [62½.] 11 fourpences? [68½.] 12 fips? [75.] 13

pences? [81½.] 14 pence? [87½.] 15 pence? [—] pence-halfpennies? [100, or one dollar.]

Q. 365. How many cents in one ninepence? many in 2 levies? [25.] in 3 York shillings? [37½.] pences? [50.] in 5 elevenpenny bits? [62½.] pieces? [75.] in 8 ninepences? [100, or one dollar.]

Q. 366. How many cents in one quarter of a dollar? How many in one half of a dollar? [50.] How many quarters of a dollar?

Q. 367. How many pence make a ninepence?

Q. 368. How many levies make a quarter of a dollar?

Q. 369. How many York shillings make half a dollar?

Q. 370. How many ninepences make three quarters of a dollar? How many ninepences in a dollar?

Q. 371. When it takes 8 parts, or 8 ninepences, to make a dollar, into how many parts is the dollar divided? [8.] then, may one ninepence, or one York shilling, be called? [1 eighth.] What may two levies be called? [2 eighths.] York shillings be called? [½.] 4 levies? [4 eighths.] 5 levies? [5 eighths.] 6? 7? 8? How many dollars is the

The pupil will read the following Tables changing the names of the 12½-cent and the 6¼-cent coins, to the names which these pieces of money bear in his own state.

It is expected the Teacher will do the same in asking all the questions in which the names of these coins are introduced.

Q. 372. Will you recite the Table that begins with the name of the 12½-cent coin?

TABLE.

1	ninepence	is	$\frac{1}{8}$ *	of a	dollar,	or	12½	cents.
2	ninepences	are	$\frac{2}{8}$ †	of a	dollar,	or	25	cents.
3	ninepences	are	$\frac{3}{8}$	of a	dollar,	or	37½	cents.
4	ninepences	are	$\frac{4}{8}$	of a	dollar,	or	50	cents.
5	ninepences	are	$\frac{5}{8}$	of a	dollar,	or	62½	cents.
6	ninepences	are	$\frac{6}{8}$	of a	dollar,	or	75	cents.
7	ninepences	are	$\frac{7}{8}$	of a	dollar,	or	87½	cents.
8	ninepences	are	$\frac{8}{8}$	of a	dollar,	or	100	cents.

* 1 eighth.

† 2 eighths.

Q. 373. At 1 dollar a yard, what will 1 eighth of a yard cost? [12 and 1 half.] will 2 eighths cost? [25.] 3 eighths cost? 4 eighths? 5 eighths? 6 eighths? 7 eighths? 8 eighths? 1 yard? 1 and 2 eighths? 1 and 3 eighths? 1 and 5 eighths? 1 and 7 eighths? 2 and 1 eighth? 3 and 2 eighths? 4 and 3 eighths? 5 and 4 eighths? 6 and 7 eighths?

Q. 374. At 2 dollars a yard, what will 1 eighth cost? [2 nine-pences, or 25 cents.] 2 eighths cost? 3 eighths? 5 eighths? 7 eighths? 8 eighths? 1 yard? 2 yards? 2 and 1 eighth?

Q. 375. At 1 eighth of a dollar a yard, what will 2 yards cost? 3 yards? 4? 5? 6? 7? 8? 8 and 1 eighth? 9 and 2 eighths? 10 and 2 eighths? 11 and 3 eighths? How many yards can you buy for 2 eighths of a dollar? for 3 eighths? 4 eighths? 6 eighths? 12 and a half cents? 25 cents? 37 and a half cents? 62 and a half cents? 87 and a half cents? 100 cents? How many cents are 2 sixteenths of a dollar? 1 fourth of a dollar? 4 eighths? 1 half? 6 eighths? 3 fourths?

Q. 376. Recite the Table that begins with two 9-pences.

TABLE.

2	ninepences	are	$\frac{2}{8}$	or	$\frac{1}{4}$	of a	dollar,	or	25 cents.
4	ninepences	are	$\frac{4}{8}$	or	$\frac{1}{2}$	of a	dollar,	or	50 cents.
6	ninepences	are	$\frac{6}{8}$	or	$\frac{3}{4}$	of a	dollar,	or	75 cents.
8	ninepences	are	$\frac{8}{8}$	or	1	dollar,	or	100 cents.	

Q. 377. At 1 dollar a yard, what will 1 eighth cost? 1 fourth? 1 half? 4 eighths? 6 eighths? 3 fourths? 2 eighths? 1 fourth? How much can you buy for 12 and a half cents? [1 eighth.] for 25 cents? [1 fourth.] 37 and a half cents? 50 cents? 62 and a half? 75? [3 fourths.] 87 and a half cents? 1 dollar and 1 eighth? 1 and 2 eighths? 1 and 1 fourth? 1 and 4 eighths? 1 and 1 half? 1 and 3 fourths?

Q. 378. When it takes 16 fourpence-halfpennies to make one dollar, into how many parts is the dollar divided? What, then, may one 4 pence-halfpenny be called? [1 sixteenth.] 2 fourpence-halfpennies? [2 sixteenths.] 3? [3 sixteenths.] 4? 5? 6? 7? 8? 9? 11? 13? 16? How many dollars is that?

Q. 379. Will you repeat the Table that begins with one 4-pence-halfpenny?

TABLE.

1	fourpence-halfpenny	is	$\frac{1}{16}$ *	of a	dollar,	or	$6\frac{1}{4}$ cents.
2	fourpence-halfpennies	are	$\frac{2}{16}$ †	of a	dollar,	or	$12\frac{1}{2}$ cents.
3	fourpence-halfpennies	are	$\frac{3}{16}$	of a	dollar,	or	$18\frac{3}{4}$ cents.
4	fourpence-halfpennies	are	$\frac{4}{16}$	of a	dollar,	or	25 cents.
5	fourpence-halfpennies	are	$\frac{5}{16}$	of a	dollar,	or	$31\frac{1}{4}$ cents.
6	fourpence-halfpennies	are	$\frac{6}{16}$	of a	dollar,	or	$37\frac{1}{2}$ cents.
7	fourpence-halfpennies	are	$\frac{7}{16}$	of a	dollar,	or	$43\frac{3}{4}$ cents.
8	fourpence-halfpennies	are	$\frac{8}{16}$	of a	dollar,	or	50 cents.
9	fourpence-halfpennies	are	$\frac{9}{16}$	of a	dollar,	or	$56\frac{1}{4}$ cents.
10	fourpence-halfpennies	are	$\frac{10}{16}$	of a	dollar,	or	$62\frac{1}{2}$ cents.
11	fourpence-halfpennies	are	$\frac{11}{16}$	of a	dollar,	or	$68\frac{3}{4}$ cents.
12	fourpence-halfpennies	are	$\frac{12}{16}$	of a	dollar,	or	75 cents.
13	fourpence-halfpennies	are	$\frac{13}{16}$	of a	dollar,	or	$81\frac{1}{4}$ cents.
14	fourpence-halfpennies	are	$\frac{14}{16}$	of a	dollar,	or	$87\frac{1}{2}$ cents.
15	fourpence-halfpennies	are	$\frac{15}{16}$	of a	dollar,	or	$93\frac{3}{4}$ cents.
16	fourpence-halfpennies	are	$\frac{16}{16}$	of a	dollar,	or	100 cents

Q. 380. At 1 dollar a yard, what will 1 sixteenth of a yard cost in cents? [6 and 1 fourth.] 2 sixteenths cost? 3 sixteenth 5 sixteenths? 4 sixteenths? 7 sixteenths? 11 sixteenths? sixteenhs? 15 sixteenhs? 16 sixteenhs? 2 sixteenhs? eighth? 4 sixteenhs? fourth? 6 sixteenhs? 3 eighths? sixteenhs? 1 half? 5 eighths? 10 sixteenhs? 12 sixteenhs? 3 fourths? 14 sixteenhs? 7 eighths?

Q. 381. Will you repeat the Table which begins with two pence-halfpennies?

* 1 sixteenth.

† 2 sixteenths

TABLE.

2	fourpence-halfpennies	are	$\frac{2}{16}$	or	$\frac{1}{8}$	of a dollar,	or	$12\frac{1}{2}$	cents.
4	fourpence-halfpennies	are	$\frac{4}{16}$	or	$\frac{1}{4}$	of a dollar,	or	25	cents.
6	fourpence-halfpennies	are	$\frac{6}{16}$	or	$\frac{3}{8}$	of a dollar,	or	$37\frac{1}{2}$	cents.
8	fourpence-halfpennies	are	$\frac{8}{16}$	or	$\frac{1}{2}$	of a dollar,	or	50	cents.
10	fourpence-halfpennies	are	$\frac{10}{16}$	or	$\frac{5}{8}$	of a dollar,	or	$62\frac{1}{2}$	cents.
12	fourpence-halfpennies	are	$\frac{12}{16}$	or	$\frac{3}{4}$	of a dollar,	or	75	cents.
14	fourpence-halfpennies	are	$\frac{14}{16}$	or	$\frac{7}{8}$	of a dollar,	or	$87\frac{1}{2}$	cents.
16	fourpence-halfpennies	are	$\frac{16}{16}$	or	1	... dollar,	or	100	cents.

Q. 382. When 1 yard of calico costs 4-pence-halfpenny, how many cents will buy 2? buy 3? 4? 5? 6? 7? 11? 10? 9? 12? 14? 13? 16?

Q. 383. At 1 fourth of a dollar a bushel, what will 2 bushels of oats cost? will 3 bushels? 4 bushels? 5? 6? 7? 8? 9? 10?

Q. 384. When melons are 1 shilling apiece, how many can you buy for 1 dollar? for 2 dollars? 3 dollars? 4? 8? 12? 20?

Q. 385. John has in his purse 2 fourpence-halfpennies, a 9-pence, and 3 cents; how much money has he in his purse?

Q. 386. I have in my purse 4 fourpence-halfpennies, 2 nine-pences, and one ten-cent piece; how much money have I in my purse?

Q. 387. John saved 9-pence a day for several days. When he counted what he had saved, he found he had one dollar. How many days was he in saving it?

Q. 388. Mr. Richmond promised his son fourpence-halfpenny, every time he would rise early and learn his lesson before breakfast. When his son had received a dollar, how many times had he risen early?

Q. 389. When John, at a certain auction, had bid 50 cents, William bid 5 eighths of a dollar. John, thinking to raise the bid, cries out, "56 $\frac{1}{2}$ cents;" but, to his disappointment, the article was struck off to William. Why was this? Which overbid the other? How much?

Q. 390. On another occasion, John bid 62 and 1-half cents for an article which he very much wanted, and which he was willing to pay 75 cents for; when William, hearing John's voice, and knowing him to be ignorant of the even parts of a dollar, immediately exclaimed, "9 sixteenths of a dollar." ^COn the inquiry, "Who was the bidder," John thought it was ^Wcreditable to him to keep still, and accordingly preserve found silence. The auctioneer, then turning to Wi

quires of him what his bid was. "9 sixteenths," says William. "It is yours," replies the auctioneer. This decision occasioned much laughter among those who understood it. Can you tell me what was the cause of it? Which overbid the other? How much?

Q. 391. After John had been repeatedly mortified in the manner above stated, he prudently resolved he would never be caught at an auction again, till he had made himself thoroughly acquainted with the *aliquot* or *even* parts of a dollar, such as eighths, sixteenths, &c. He accordingly purchased Smith's Introductory Arithmetic, it being the only one, that he could find, which contained the desired information. Now, I wish you would inform me how many days it will take John to learn the Table of 9-pences, if he learns one aliquot or even part every morning before breakfast; how long the Table of 4-pence-half-pennies, if he learns at the same rate?

Q. 392. Will you repeat the Table of Multiplication backwards, beginning with 2? 3? 4? 5? 6? 7? 8? 9? 10? 11? 12? the Table of Federal Money? Wine Measure? Ale or Beer Measure? Dry Measure? Apothecaries' Weight?

TIME.

Used in reckoning different periods of time, as months, days, &c.

TABLE.

60	seconds (s.)	make . . .	1 minute,	sign	m.
60	minutes	make . . .	1 hour,	sign	h.
24	hours	make . . .	1 day,	sign	d.
7	days	make . . .	1 week,	sign	w.
4	weeks	make . . .	1 month,	sign	mo.
12	calendar months	make . . .	1 year,	sign	yr.
365 $\frac{1}{4}$	days	make . . .	1 year,	sign	yr.
100	years	make . . .	1 century,	sign	cen.

¹² Will you repeat the Table?

ny minutes in 61 seconds? [1 m. and 1 s.]
and 5 s.] in 70? 80? 90? 100? 110? 120?
[1 h. and 1 m.] in 65 minutes? in 70
5 hours? [1 d. and 1 h.] in 26? 27? 3

Q. 395. How many hours in 1 day? in 1 and 1 twenty-fourth? [25.] in 1 and 2 twenty-fourths? 1 and 3 twenty-fourths? 1 and 10 twenty-fourths? 1 and 20 twenty-fourths? 1 and 22 twenty-fourths?

Q. 396. If your watch click once in 1 second, how many times will it click in 2 seconds? in 10? 40? 60? 1 minute? 1 and 1 sixtieth? 1 and 5 sixtieths? 1 and 10 sixtieths?

Q. 397. When labor is one dollar a day, how much will 1 week's labor cost? 4 weeks? 1 month? 30 days? 100 days? 300 days? 1 year?

Q. 398. How many years in 2 centuries? in 3 and 1 hundredth? in 4 and 2 hundredths?

Q. 399. How many days are there in each month?

A. Thirty days hath September,
April, June and November;
February hath twenty-eight,
And thirty-one the others rate,
Except in leap year, happening once in four,
When we give to February one day more.

Q. 400. How many days are there in January? in February? March? April? May? June? July? August? September? October? November? December?

Q. 401. How many days has February in leap year?

Q. 402. What are the denominations of Time?

A. Seconds, minutes, hours, days, weeks, months, years and centuries.

Q. 403. For what is this Table used?

Q. 404. What do you mean by *periods* of time?

A. *Portions* of time, as days, months, &c.

Q. 405. What does *vicissitude* mean, as, the *vicissitude* of day and night?

A. *Regular change.*

Q. 406. What is it which occasions the agreeable vicissitude of day and night?

A. The complete revolution of the earth on its axis.

Q. 407. What do you mean by *complete*? A. *Perfect, entire, full.* By *revolution* or *revolving*? A. *Turning*, as a wheel turns. By *axis*? A. *Something* passing through the centre, to turn on. Will you illustrate it by an example? The axle-tree of a cart or wagon.

Q. 408. Is the axis of the earth an imaginary line merely? or does the earth actually have something to turn on?

A. The axis of the earth is an imaginary line merely.

Q. 409. What do you mean by *imaginary*?

A. *Not real, existing only in the mind, being nothing at all, fact.*

Q. 410. What do the day and night both form in reckoning?
A. One day.

- Q. 411. What forms a year in reckoning?
A. The complete revolution of the earth round the sun?
- Q. 412. In how many days is it generally supposed that the earth performs this revolution?
A. In 365 $\frac{1}{4}$ days, or nearly that time.
- Q. 413. How long by a more accurate calculation?
A. 365 days, 5 hours, 48 minutes and 50 seconds.
- Q. 414. What is this period often styled?
A. The Solar year, from *solar*, *of*, or *belonging to, the sun*.
- Q. 415. How many days, in ordinary computation, do we allow to the year?
A. 365, and every fourth year 366.
- Q. 416. "Ordinary computation"—what does that mean?
A. *Common reckoning*.
- Q. 417. You recollect that 365 $\frac{1}{4}$ days, or nearly that, make one year; how, then, do we get the 365?
A. By dropping the 1 quarter of a day.
- Q. 418. Dropping 1 quarter every year, will make, in 4 years, 4 quarters, or one day; how, then, do you obtain the 366?
A. Adding the 4 quarters, or the 1 day, to 365, makes 366.
- Q. 419. To which month do we assign this extra day?
A. To February.
- Q. 420. What do you mean by *assign*?
A. *Allot, appoint, give*.
- Q. 421. How many days will February then have?
A. Twenty-nine.
- Q. 422. What is every fourth year often styled?
A. Leap year.
- Q. 423. Why does it receive this name?
A. Because the year *leaps* or *advances* a day more that year than any other.
- Q. 424. William bought 2 yards of calico for 9 pence; how much did it cost by the yard? how many cents will buy 4 yards? 5 yards? 6 yards? 7? 9? 12? 13? 16?

CIRCULAR MOTION

Is so called from the motion of the earth and other planets round the sun. It is used for reckoning latitudes and longitudes.

TABLE.

60 seconds (")	make	1 minute,	sign '.
minutes	make	1 degree,	sign °.
degrees	make	1 sign,	sign S.
signs,		the whole circle of the	

Q. 425. Will you repeat the Table ?

Q. 426. How many seconds in 3 minutes ? in 3 and 1 sixtieth ? 2 and 1 sixtieth ? 1 and 1 sixtieth ? 1 and 5 sixtieths ?

Q. 427. How many degrees in 120 minutes ? in 61 ? [1 and 1 m.] in 65 ? 70 ? 80 ? 90 ? 100 ? 110 ? 120 ?

Q. 428. What are the denominations of Circular Motion ?

A. Seconds, minutes, degrees, signs and circles.

Q. 429. Will you repeat the Table of Circular Motion backwards ? Time backwards ? the Table of ninepences ? Table of fourpence-halfpennies ?

TABLE OF PARTICULARS.

Q. 430. What do

12	single things .	make ?	A. 1 dozen.	
12	dozen	make ?	A. 1 gross.	
12	gross	make ?	A. 1 great gross.	
20	single things .	make ?	A. 1 score.	
24	sheets	make ?	A. 1 quire,	of paper.
20	quires	make ?	A. 1 ream,	of paper.
200	pounds	make ?	A. 1 barrel,	of beef or pork.
100	pounds	make ?	A. 1 quintal,	of fish.
21½	stone	make ?	A. 1 pig,	of lead.
8	pits	make ?	A. 1 fother.	

Q. 431. How many single things make 2 dozen ? make 3 dozen ? 5 ? 6½ ? 7 ? 7½ ? 8 ? 12 ? 12 times 12, how much ? How many single things in 1 gross ? 12 times 144, how much ? [1728.] How many single things, then, in one great gross ?

Q. 432. What will 1 quire of paper cost, at a cent a sheet ?

Q. 433. What will 8 pounds of pork cost, at 9 pence a pound ? What will 16 pounds ? 24 pounds ? 48 ? 1 barrel, at 2 cents a pound ? at 4 cents ? 3 cents ?

LONG MEASURE.

Used in measuring length, or distance, only.

TABLE.

3 barley-corns (b. c.)	make . 1 inch,	sign in.
12 inches	make . 1 foot,	sign ft.
3 feet	make . 1 yard,	sign yd.
5½ yards, or 16½ feet,	make . 1 rod or pole, . . .	sign rd.
40 rods	make . 1 furlong, . . .	sign fur.
8 furlongs	make . 1 mile,	sign m.
3 miles	make . 1 league, . . .	sign l.
69½ statute miles . . .	make . 1 degree, . . .	sign deg.
60 geographical miles	make . 1 degree, . . .	sign deg.
360 degrees,	the earth's circumference.	

Q. 433. Will you repeat the Table?

Q. 434. If a man travel 1 furlong in 5 minutes, how far can he travel in 10 minutes? in 15? 16? [3 and 1 fifth.] 17? 18? 20? 24? 25?

Q. 435. How many barley-corns in 2 inches? in 3? 6? 8? 10? 12?

Q. 436. How many inches in 3 feet? in 4? 4 and 1 twelfth? [49.] 5 and 1 twelfth? 6 and 1 twelfth? 7 and 2 twelfths? 8 and 3 twelfths?

Q. 437. How much is 1 eighth of a mile? 3 eighths? 5 eighths? 8 eighths? 1 and 1 eighth?

Q. 438. If a bird flies a mile in 1 minute, how far will it fly in 10 minutes? in 1 fourth of an hour? in 1 half of an hour? in 3 fourths? in 1 hour?

Q. 439. What is the use of this measure?

Q. 440. What are the denominations?

A. Barley-corns, inches, feet, yards, rods or poles, furlongs, miles, leagues and degrees.

ADDITIONAL TABLE.

4 inches . . .	make . . .	1 hand.
5 feet . . .	make . . .	1 geometrical space.
	make . . .	1 fathom.
	make . . .	1 line.
	make . . .	1 inch.

Q. 441. What do we measure by hands? *A.* The height of horses. What, by geometrical spaces? *A.* Distances on land. What, by leagues? *A.* Distances at sea. What, by fathoms? *A.* Depths at sea. What, by points and lines? *A.* Lengths of pendulum rods for time-keepers.

Q. 442. How many hands in 8 inches? in 12? 24? 36? 40? 48?

Q. 443. How many feet in 5 spaces? in 12? in 1 fathom? in 2? 2 and 1 sixth? 3 and 2 sixths? 4 and 3 sixths? 5 and 4 sixths? 6 and 5 sixths? 7?

Q. 444. Will you repeat the Table of Long Measure backwards? Circular Motion in like manner? Time? Additional Table in Long Measure forwards?

S Q U A R E M E A S U R E .

Used in measuring length and breadth, only.

TABLE.

144 square inches	(sq. in.)	make . . .	1 square foot.	sq. ft.
9 square feet		make . . .	1 square yard.	sq. yd.
30 $\frac{1}{4}$ square yards		make . . .	1 square rod.	sq. rd.
272 $\frac{1}{4}$ square feet		make . . .	1 square rod.	sq. rd.
40 square rods		make . . .	1 rood.	rood.
4 roods		make . . .	1 acre.	acre.
640 acres		make . . .	1 square mile.	sq. mi.

Q. 445. Will you repeat the Table?

Q. 446. How many square feet in 3 square yards? in 3 and 1 ninth? 4 and 2 ninths? 5 and 3 ninths? 6 and 4 ninths? 7 and 5 ninths? 8 and 6 ninths?

Q. 447. How many square yards in 36 square feet? in 37? 38? 40? 45? 46?

Q. 448. How many roods in 41 square rods? [1 rood and 1 sq. rd.] in 42? 45? 47? 50? 60? 61? 70? 71? 80? 81?

Q. 449. At a dollar a square rod, what will one rood of land cost? will 2? 3? How many rods can we buy for 40 dollars for 80 dollars?

Q. 450. What is the use of this measure?

Q. 451. What are its denominations?

A. Inches, feet, yards, rods, roods, acres, and miles.

Q. 452. Will you repeat the Table backwards? the Table of Long Measure backwards?

CUBIC MEASURE.

Used in measuring length, breadth, and thickness.

TABLE.

1728 solid inches	make . 1 solid foot.
40 feet of round timber . . .	make . 1 ton.
50 feet of hewn timber . . .	make . 1 ton.
27 solid feet	make . 1 solid yard.
128 solid feet, or 8 feet long, } 4 wide, and 4 high, }	make . 1 cord of wood.

Q. 453. Will you repeat the Table?

Q. 454. What will a parcel of wood cost, which is 8 feet long, 4 feet high, and 4 feet wide, at 6 dollars a cord?

Q. 455. If you pay 8 dollars for a ton of round timber, what will 80 feet cost? 40 feet cost?

Q. 456. Will you repeat the Table backwards? the Table of Square Measure? Long Measure? Circular Motion? Time? Apothecaries' Weight? Troy Weight? Avoirdupois Weight? Dry Measure? Wine Measure? Ale or Beer Measure? Sterling Money? Federal Money? the Multiplication Table, beginning with 2? 3? 4? 5? 6? 7? 8? 9? 10? 11? 12? Table of numbers, beginning with 1 and 2? (181.*) with 2? (264.*) the Table that begins with one 9-pence? (372.*) Table that begins with one fourpence-halfpenny? (379.*) with two 9-pences? (376.*) with two 4-pence-halfpennies? (381.*)

* Refer back to this number.

NUMERATION.

Q. 457. When I say to you, Give me that book, do I mean one book, or more than one?

Q. 458. When we speak of a single thing, then, what is it called?

A. A unit, or one.

Q. 459. What are one unit and one more, or one and one, called?

Q. 460. What are two units and one more, or two and one, called?

Q. 461. What are three units and one more, or three and one, called?

Q. 462. What are four units and one more, or four and one, called?

Q. 463. What are five units and one more, or five and one, called?

Q. 464. What are six units and one more, or six and one, called?

Q. 465. What are seven units and one more, or seven and one, called?

Q. 466. What are eight units and one more, or eight and one, called?

Q. 467. What are nine units and one more, or nine and one, called?

Q. 468. Now, to be obliged always to write these numbers out in words, would be very troublesome: to prevent this, how do we sometimes express the numbers one, two, &c., up to thousands, millions, &c.?

A. By letters.

Q. 469. What does the letter I stand for?

A. One.

Q. 470. What does the letter V stand for?

A. Five.

Q. 471. What does the letter X stand for?

A. Ten.

Q. 472. What does the letter L stand for?

A. Fifty.

Q. 473. What does the letter C stand for?

A. One hundred.

Q. 474. What does the letter D stand for?

A. Five hundred.

Q. 475. What does the letter M stand for?

A. One thousand.

NUMERATION.

Q. 476. You said that V stands for five; suppose you place the letter I before the V, thus, IV, what will both these letters stand for then? *A.* Only four.

Q. 477. One X stands for ten. What do two XXs stand for? *A.* Twenty.

Q. 478. How many letters do we use for expressing numbers, and which are they?

A. Seven; I, V, X, L, C, D, M.

Q. 479. What is the method of expressing numbers by letters called?

A. The *Roman* method.

Q. 480. Why has it this name?

A. Because the Romans invented and used it.

Q. 481. Will you recite the following Table?

ROMAN TABLE.

One	I.	Thirty	XXX.
Two	II.	Forty	XL.
Three	III.	Fifty	L.
Four	IV.	Sixty	LX.
Five	V.	Seventy	LXX.
Six	VI.	Eighty	LXXX.
Seven	VII.	Ninety	XC.
Eight	VIII.	One hundred	C.
Nine	IX.	Two hundred	CC.
Ten	X.	Three hundred	CCC.
Eleven	XI.	Four hundred	CCCC.
Twelve	XII.	Five hundred	D.
Thirteen	XIII.	Six hundred	DC.
Fourteen	XIV.	Seven hundred	DCC.
Fifteen	XV.	Eight hundred	DCCC.
Sixteen	XVI.	Nine hundred	DCCCC.
Seventeen	XVII.	One thousand	M.
Eighteen	XVIII.	Fifteen hundred	MD.
Nineteen	XIX.	Sixteen hundred	MDC.
Twenty	XX.	Two thousand	MM.
Eighteen hundred and thirty-four		MDCCCXXXIV.	

Q. 482. What Roman letter stands for one? for two? three? four? seven? five? twelve? nine? eleven? eight? ten? six? fifteen? thirteen? sixteen? fourteen? twenty? eighteen? seventeen? nineteen? thirty? sixty? forty? seventy? fifty? one hundred? ninety? five hundred? three hundred? two hundred? eight hundred? six hundred? two thousand? sixteen hundred? one thousand?

Q. 483. What numbers do the following letters represent, namely :—

I?	XXI?	M?
II?	XXXII?	MD?
III?	XLV?	MDC?
IV?	LXXII?	MDCC?
VI?	XCV?	MDCCC?
IX?	CC?	MDCCCX?
XI?	CCV?	MDCCCXX?
XV?	DV?	MDCCCXXX?
XX?	DXV?	MDCCCXXXIV?

Q. 484. We have a 'shorter method still of expressing numbers, which is in very general use: can you inform me how it is done?

A. By certain characters, called *figures*.

Q. 485. What is this method by figures called?

A. The *Arabic* method.

Q. 486. Why has it this name?

A. Because the Arabs are supposed to have invented it.

Q. 487. What are figures sometimes called?

A. Digits.

Q. 488. *Digit*, from the Latin *digitus*, signifies a *finger*; but what reason does this furnish for calling figures digits?

A. From the practice of counting the fingers in reckoning.

Q. 489. Will you repeat the nine digits?

A. 1, 2, 3, 4, 5, 6, 7, 8, 9.

Q. 490. Have we any other figures in use to express numbers, ever so large?

A. We have none.

Q. 491. How, then, do we express the number ten?

A. By the aid of a cipher, and the figure 1.

Q. 492. How is it done?

A. By placing the cipher at the right of the figure 1.

Q. 493. What is the name of the place which the cipher occupies?

A. The units' place.

Q. 494. What has become of the figure 1?

A. It occupies a new place.

Q. 495. What is the name of this place?

A. Tens.

Q. 496. What does 3, with a cipher at its right, represent?
[30] 4 and a cipher? 9 and a cipher?

Q. 497. If we remove 9 from 90, what remains?

A. Nothing but 0, or cipher.

Q. 498. What does 0 9 mean?

A. No tens and 9 units, or simply 9.

Q. 499. What, then, is the value of a cipher standing alone or on the left of any whole number?

A. No value.

Q. 500. Ten times 9 are how many?

Q. 501. What does 9, then, with a cipher at its right mean?

Q. 502. How many times is the 9 increased by the cipher at its right?

A. Ten times.

Q. 503. What effect, then, does the placing of a cipher at the right of any figure have on the value of that figure?

A. It increases its value in a tenfold proportion.

Q. 504. How does the figure acquire this additional value?

A. By being removed from the place of units to the place of tens.

Q. 505. Is the tens' place on the right or on the left of the units' place, as 90, for instance?

Q. 506. In what direction and proportion, then, do figures increase?

A. From the right to the left, in a tenfold proportion.

Q. 507. What two numbers can 2 and 5 be made to represent?

A. 25 and 52.

Q. 508. How, then, does the value of a figure vary?

A. According to the place it occupies.

Q. 509. What does *local* mean?

A. *Relating to place.*

Q. 510. What, then, shall we call that value of figures which arises from a change of place?

A. Local value.

Q. 511. What value does a figure standing alone possess, as, 6, or 5, for instance?

A. It always retains the same value.

Q. 512. What is this value therefore called?

A. Simple value.

Q. 513. What do you mean by *simple*?

A. *Disconnected or alone.*

Q. 514. How many values, then, do figures appear to have and what are they?

A. Two; simple and local.

Q. 515. When has a figure its simple, and when its local value?

A. A figure has its simple value when it stands alone, and its local value when it is combined with other figures.

Q. 516. What do you mean by *combined*?

Q. 518. Prefix 2 to 0, and what number will it represent?
[20.] 3 to 0, what number? 7 to 0, what number?

Q. 519. In the number 5, what is the name of the place which it occupies?

A. Units.

Q. 520. What is its value, then?

A. 5 units.

Q. 521. How is it read?

A. Five.

Q. 522. Prefix one 5 to another 5; what are the names of both their places?

A. Units, tens.

Q. 523. What is their value, then?

A. 5 units and 5 tens.

Q. 524. How are they read?

A. Fifty-five.

Q. 525. Prefix another 5 to 55; what are the names of their places?

A. Units, tens, hundreds.

Q. 526. What is their value?

A. 5 units, 5 tens, and 5 hundreds.

Q. 527. How are they read?

A. 5 hundred and 55.

Q. 528. Prefix another 5 to 555; what are the names of their places?

A. Units, tens, hundreds, thousands.

Q. 529. What is their value?

A. 5 units, 5 tens, 5 hundreds, and 5 thousands.

Q. 530. How are they read?

A. 5 thousand 5 hundred and 55.

Q. 531. Prefix another 5 to 5555; what are the names of their places?

A. Units, tens, hundreds, thousands, tens of thousands.

Q. 532. What is their value, then?

A. 5 units, 5 tens, 5 hundreds, 5 thousands, and 5 tens of thousands.

Q. 533. How are they read?

A. 55 thousand 5 hundred and 55.

Q. 534. Prefix another 5 to 55555; what are the names of their places?

A. Units, tens, hundreds, thousands, tens of thousands, hundreds of thousands.

Q. 535. What is their value, then?

A. 5 units, 5 tens, 5 hundreds, 5 thousands, 5 tens of thousands, 5 hundreds of thousands.

Q. 536. How are they read?

A. 5 hundred 55 thousand 5 hundred and 55.

Q. 537. Prefix another 5 to 555555; what are the names of their places?

A. Units, tens, hundreds, thousands, tens of thousands, hundreds of thousands, millions.

Q. 538. What is their value?

A. 5 units, 5 tens, 5 hundreds, 5 thousands, 5 tens of thousands, 5 hundreds of thousands, and 5 millions.

Q. 539. How are they read?

A. 5 million 5 hundred 55 thousand 5 hundred and 55.

Q. 540. What name has this process of reading numbers received?

A. Numeration.

Q. 541. Why has it this name?

A. Because *numeration* signifies *numbering*.

Q. 542. What, then, does Numeration teach?

A. Numeration teaches us how to read and write numbers, by means of characters called *figures*.

Q. 543. In ascertaining the value of figures, by Numeration, at which hand do you begin, and how do you proceed?

A. At the right hand, and proceed towards the left.

Q. 544. What is the first figure on the right called? [units.] the second? [tens.] third? fourth? fifth? sixth?

Q. 545. When you have assigned to several figures their proper value, how do you proceed in reading them?

A. Begin on the left, and proceed towards the right, observing to give each figure its assigned value.

Q. 546. What do you mean by *assigned*?

A. *Allotted, fixed, appointed.*

NUMERATION TABLE

MILLIONS.	Hundreds of Thousands.	Tens of Thousands.	THOUSANDS.	Hundreds.	Tens.	UNITS.	
1	0	0	0	0	0	0	read—1 million.
2	0	0	0	0	0	0	read—2 hundred thousand.
3	0	0	0	0	0	0	read—30 thousand.
4	0	0	0	0	0	0	read—4 thousand.
5	0	0	0	0	0	0	read—5 hundred.
6	0	0	0	0	0	0	read—Sixty.
							—Seven.

Q. 547. Will you repeat the Numeration Table, by saying, units, tens, &c.?

Q. 548. Examine the Table, and then inform me what number is represented by 36 and 1 cipher? by 5 and 00? by 5 and 000? 5 and 0000? by 4 and 000? by 3 and 0000? by 2 and 00000? by 1 and 000000? by 2 and 0? 3 and 0? 5 and 0? 6 and 00? 8 and 000? 9 and 0000? 8 and 00000? 7 and 000000? How many ciphers are there in 7 000000? How many ciphers, then, at the right of any figure, will carry that figure into the millions' place, or, in other words, make it so many millions?

Q. 549. Will you repeat the Table of Numeration, beginning with '10 units'?

TABLE.

10 units	make	1 ten.
10 tens	make	1 hundred.
10 hundreds	make	1 thousand.
10 thousands	make	1 ten thousand.
10 ten thousands	make	1 hundred thousand.
10 hundred thousands .	make	1 million.

Q. 550. How many tens in 10 units? in 20 units? in 30? 50? 12? [1 ten and 2 units.] in 13? 19? 49? 89? Units in 1 ten? in 2? 5? 7? 9? 1 ten and 2 units? 1 ten and 5 units? 4 tens and 9 units? 8 tens and 9 units?

Q. 551. How many hundreds in 1 thousand? in 2? 3? 4? tens in 10 hundreds? units in 100 tens? units, then, in 1 thousand?

Q. 552. How many units in 2 tens? in 2 hundreds? in 2 thousands? 2 ten thousands? 1 hundred thousand?

Q. 553. Do 6 tens and 3 units, added together, make 9 units, or 9 tens, or do they make neither? *A.* Neither.

Q. 554. Can you add 6 tens and 3 hundreds together? Why not? *A.* Because they are of different denominations.

Q. 555. Will you repeat the Table of Federal Money?

Q. 556. How does Federal Money appear to resemble whole numbers?

A. By increasing from the right to the left in the same proportion.

Q. 557. What is that proportion? (506.)

Q. 558. Numerate seven fingers, by saying of the first, units, of the second, tens, &c., to the seventh; if, then, the seventh finger were a 6, and all the remaining ones ciphers, what would the 7 be called? why? [Because the 7 comes millions in numbering.] Why do we call 6 with 000, 6 thousand? Why 1 00, 1 hundred? Why 8 and 0000, 80 thousand?

Q. 559. Will you repeat the Division Table backwards, beginning with 12 in 144? 11 in 132? 10 in 120? 9 in 108? 8 in 96? 7 in 84? 6 in 72? 5 in 60? 4 in 48? 3 in 36? 2 in 24?

Q. 560. Will you repeat the Table that begins with one 9-pence? with two 9-pences? with one 4-pence-halfpenny? with two 4-pence-halfpennies?

SIMPLE ADDITION.

Q. 561. Thomas gave, for *Smith's Practical and Mental Arithmetic*, 50 cents; for his *Intellectual and Practical Grammar*, 42 cents; and for his *Productive Grammar*, 50 cents; what did Thomas pay for the whole?

Q. 562. John gave 200 dollars for a chaise; 60 dollars for a horse; and 5 dollars for a whip; what did the whole cost?

Q. 563. William did 200 sums in one week, 70 in another, and only 8 in the third; how many were done by him in all?

Q. 564. One regiment consists of 1000 men, another of 500, and the number of officers in both is 50; how many men are there in all?

Q. 565. William paid 100 dollars for one quarter of a pew; what is the value of the whole pew at that rate? the value of 2 pews? 3 pews? 4 pews? 5 pews? 6? 7? 8? 9? 10? 11? 12?

Q. 566. A man sold his farm, receiving his pay as follows: 2000 dollars, in merchandise; 500 dollars in labor, and only 50 dollars in cash? What was the sum received for his farm?

Q. 567. One basket contains 400 apples, another, 600, and the third, 200; how many apples do the three baskets contain in all?

Q. 568. How many are 100 and 200 and 300?

Q. 569. How many are 300 and 200 and 100?

Q. 570. How many are 400 and 300 and 200?

Q. 571. How many are 500 and 400 and 300?

Q. 572. How many are 600 and 300 and 100?

Q. 573. How many are 700 and 300 and 100?

Q. 574. How many are 700 and 100 and 300?

Q. 575. How many are 700 and 300 and 500?

Q. 576. How many are 200 and 300 and 120?

Q. 577. How many are 700 and 300 and 250?

Q. 578. How many are 600 and 400 and 675?

Q. 579. What name has been given to this exercise of putting numbers together?

Addition.

- Q. 580. Why has it this name ?
A. Because *addition* signifies *joining*, or *putting together*.
 Q. 581. What does *denomination* mean ? (158.)
 Q. 582. What are denominations ? (160.)
 Q. 583. Do 10 apples and 10 pens, when added together, make 20 apples, or 20 pens, or do they make neither ? Why ?
A. Because they are not of the same denomination.
 Q. 584. What does *sum*, or *amount*, mean ?
A. *All put together*, or *the whole*.
 Q. 585. What, then, is the sum, or amount, in addition ?
A. The amount is that number which is formed by adding all the smaller ones together.
 Q. 586. What is the amount of 20 and 30 and 50 ?
 Q. 587. What is the amount of 40 and 20 and 60 ?
 Q. 588. What is the amount of 25 and 25 and 10 ?
 Q. 589. What does *simple* mean ? (513.)
 Q. 590. What is Simple Addition ?
A. Simple Addition is finding the amount of two or more numbers of the same denomination.
 Q. 591. Henry has 1 third of an orange, and John 2 thirds ; how much do they both have ? What is the amount of 1 third and 2 thirds ? [1 whole.] 1 fourth and 3 fourths ? 1 fifth and 2 fifths ? [3 fifths.] 1 fifth and 2 fifths and 3 fifths ? 1 fifth and 2 fifths and 3 fifths and 4 fifths ? [two.]
 Q. 592. James has 1 eighth of a pie, John 4 eighths, and Thomas 3 eighths ; have the three one whole pie ? How much is 1 eighth and 4 eighths and 3 eighths ? 2 eighths and 3 eighths and 1 eighth ? 4 eighths and 3 eighths and 9 eighths ? 4 sevenths and 2 sevenths and 1 seventh ? [1.] 1 ninth and 2 ninths and 3 ninths and 4 ninths and 5 ninths and 6 ninths and 6 ninths ? [3.]
 Q. 593. Will you repeat the Numeration Table ? Federal Money ? Wine Measure ? Table to be added, which begins with 1 and 2 ? (181.)

SIMPLE SUBTRACTION.

- Q. 594. A man, owing 200 dollars, paid 100 ; how much did he then owe ? 100 from 200, how many ? Why ? [100 and 100 are 200.]
 Q. 595. William, having 300 walnuts in a basket, took 200 ; how many had he left ? 200 from 300, how many ?

Q. 596. Two boys were playing at marbles; when they began, they had 20 apiece; after a few games, one boy found he had but 14 marbles left; how many had he lost? How many had the other boy in all?

Q. 597. How many does 200 from 400 leave? Why?

Q. 598. How many 300 from 500? Why?

Q. 599. How many 200 from 500? Why?

Q. 600. How many 400 from 600? Why?

Q. 601. How many 300 from 700? Why?

Q. 602. How many 500 from 800? Why?

Q. 603. How many 700 from 900? Why?

Q. 604. How many 800 from 850? Why?

Q. 605. How many 800 from 950? Why?

Q. 606. How many 850 from 950? Why?

Q. 607. How many 900 from 956? Why?

Q. 608. A farmer had 1000 sheep; when he had lost 500, how many had he left? when he had lost 100 more, how many had he left? 100 more, how many left? 100 more, how many left? 100 more, how many left? 100 more, how many left?

Q. 609. How many does 500 from 1000 leave? Why?

Q. 610. How many 600 from 1000? Why?

Q. 611. How many 700 from 1000? Why?

Q. 612. How many 800 from 1000? Why?

Q. 613. How many 900 from 1000? Why?

Q. 614. John, having 2 thirds of an apple, gives away 1 third; how much has he remaining? 1 third from 2 thirds, how much remains? Why? [1 third and 1 third are 2-thirds.]

Q. 615. Take 1 fourth from 3 fourths; what remains?

Q. 616. Take 2 fourths from 3 fourths; what remains?

Q. 617. Take 1 fifth from 4 fifths; what remains?

Q. 618. Take 1 sixth from 5 sixths; what remains?

Q. 619. Take 2 sevenths from 5 sevenths; what remains?

Q. 620. Take 5 eighths from 7 eighths; what remains?

Q. 621. Take 2 ninths from 8 ninths; what remains?

Q. 622. What name has the foregoing exercise received?

A. Subtraction.

Q. 623. Why has it this name?

A. Because *Subtraction* signifies the act of taking from.

Q. 624. How much greater is 600 than 500? How much, then, do 600 and 500 differ?

Q. 625. What, then, do we find by subtraction; the difference between two numbers, or their amount?

Q. 626. Do you recollect what Addition is? (590.)

Q. 627. How, then, do Addition and Subtraction differ?

A. *verse of the other.*
that reverse means?

Q. 629. If you have 26 pins on your sleeve, and take off 6, how many will remain on your sleeve? What is the difference between 6 and 26?

Q. 630. If 20 remains, what may this difference be called?

A. Remainder.

Q. 631. You can take 6 pins from 26 pins; but can you take 6 pins from 26 dollars? Why not? (583.)

Q. 632. Can you tell what *simple* means? (513.)

Q. 633. Several particulars about Subtraction have now been explained to you; will you, therefore, give me a full definition of Simple Subtraction?

A. Simple Subtraction is finding the difference between any two numbers of the same denomination.

Q. 634. Take 100 apples from a basket containing 500. How much will the number of apples in the basket be diminished or lessened? Which number is lessened, the 500 or the 100?

Q. 635. What name, then, shall we give to the 500?

A. Minuend.

Q. 636. Why has it this name?

A. Because *minuend* signifies to be diminished, or lessened.

Q. 637. What, then, is the Minuend?

A. The number to be lessened, by subtracting from it.

Q. 638. What does *Subtrahend* mean?

A. To be taken from.

Q. 639. Take 300 from 400; which number is taken from the other?

Q. 640. What, then, may the 300 be called?

A. The Subtrahend.

Q. 641. What, then, is the Subtrahend?

A. The number to be subtracted.

Q. 642. Take 400 from 600; how many will remain? What is the 200 called? (630.) the 400 called? (637.)

Q. 643. Take 8 from 10; which is the Minuend? Why? (636.) Which the Subtrahend? Why? (641.) Which the Remainder? Why? (630.)

Q. 644. How many terms do there appear to be in subtraction, and what are they?

A. Three—Minuend, Subtrahend, and Difference.

Q. 645. Can we take a greater number from a less one? as 8 from 6, for instance?

Q. 646. Which, then, of the two, minuend and subtrahend, must be the greater? which the less?

Q. 647. What number does 7 with 0 represent? 8 and 00? 5 and 000? 5 and 0000? 6 and 0000? 7 and 8 and 000000? Why?

Q. 648. Will you repeat the Table of Ale or Beer backwards? Dry Measure, backwards? Troy W. wards? Apothecaries' Weight, backwards?

SIMPLE MULTIPLICATION.

Q. 649. Henry did 100 sums a day, for 4 days; how many did he do in all? 4 times 100 are how many?

Q. 650. At 4 cents a pound, what will 100 pounds of pork cost? 200 pounds cost? 1 barrel cost?

Q. 651. John bought a house and barn: for the barn he gave 200 dollars, and for the house 5 times as much; what did the house cost? how much did the house cost more than the barn? what did both cost? 5 times 200 are how many? 200 from 1000 are how many? 1000 and 200 are how many? At 25 cents a quart, what will a gallon of brandy cost? will one barrel? one tierce? one hogshead?

Q. 652. At 9 pence a peck, what will one bushel of corn cost? 2 bushels? 3 bushels? 4? 5? 6? 7? 8? 9? 10? 11? 12?

Q. 653. How many are 2 times 100? Why?

Q. 654. How many are 3 times 200? Why?

Q. 655. How many are 4 times 200? Why?

Q. 656. How many are 3 times 300? Why?

Q. 657. How many are 5 times 200? Why?

Q. 658. How many are 6 times 200? Why?

Q. 659. How many are 8 times 300? Why?

Q. 660. How many are 9 times 200? Why?

Q. 661. How many are 8 times 800? Why?

Q. 662. How many are 9 times 400? Why?

Q. 663. How many are 8 times 600? Why?

Q. 664. Henry has $\frac{1}{3}$ of an orange, and John twice as much: how much does John have? 2 times $\frac{1}{3}$ is how much, then? How much more does one have than the other? How much do they both have?

Q. 665. How many 4ths are 2 times $\frac{1}{4}$?

Q. 666. How many 3ds are 3 times $\frac{2}{3}$?

Q. 667. How many 5ths are 4 times $\frac{1}{5}$?

Q. 668. How many 6ths are 5 times $\frac{1}{6}$?

Q. 669. How many 13ths are 6 times $\frac{2}{13}$?

Q. 670. How many 17ths are 5 times $\frac{3}{17}$?

Q. 671. John bought $\frac{1}{8}$ of a vessel, and his brother 8 times as much. Did his brother then own a whole vessel? How many eighths did he own? 8 times $\frac{1}{8}$ are how many wholes? 9 eighths are how many wholes? [One and $\frac{1}{8}$ th.]

672. How many wholes are 3 times $\frac{1}{3}$?

673. How many wholes are 4 times $\frac{2}{4}$?

674. How many wholes are 5 times $\frac{2}{5}$?

Q. 675. How many wholes are 8 times 1 third?

Q. 676. How many wholes are 9 times 1 eighth?

Q. 677. How many wholes are 7 times 4 fifths?

Q. 678. How many wholes are 8 times 9 eighths?

Q. 679. What are these exercises generally styled?

A. Multiplication.

Q. 680. Why have they this name?

A. Because *multiplication* signifies *increasing* or *repeating*.

Q. 681. John did ten sums in one day, 10 in another, 10 in a third, 10 in a fourth, 10 in a fifth, 10 in a sixth, 10 in a seventh, and 10 in the eighth. How many sums do all these make added together? How many, then, are 10 and 10 and 10 and 10 and 10 and 10 and 10 and 10? How many days did John cipher? How many are 8 times 10? It appears, then, that we can tell how many sums John did in all, either by Multiplication or by Addition; but which appears to be the easier and shorter method?

Q. 682. If John had done 2 sums in one day, 3 in another, and 4 in the third, how many would he have done in all? Can you find how many he did by Multiplication?

Q. 683. Why not?

A. Because he did not do an *equal* number each day?

Q. 684. When is Multiplication styled *simple*? (590.)

Q. 685. From these particulars we have a good definition of Multiplication. Will you repeat it?

A. Multiplication is repeating or increasing the same number once or more.

Q. 686. When and in what particular is it preferable to Addition?

A. When the numbers to be added are equal, it is a concise way of performing many additions.

Q. 687. "Concise!" that is a new term; what do you mean by *concise*? A. *Contracted*, *short*.

Q. 688. John had 6 sheep given him. In a few years, his number increased 10 times. How many sheep did he then have? How many times was his number 6 increased or repeated? What, then, may the 6 be called, and why?

A. Multiplicand, because *multiplicand* signifies *to be repeated*, or *increased*.

Q. 689. What, then, is the Multiplicand?

A. The number to be multiplied or repeated.

Q. 690. When I say, 4 times 100 are 400, which number is the Multiplicand? Why? (688.) Which repeats or multiplies the other? What, then, shall we call the 4, and why?

A. The Multiplier; because *multiplier* signifies *that which increases or repeats*.

Q. 691. What, then, is the Multiplier?

A. That number by which we repeat or multiply.

SIMPLE DIVISION.

- Q. 692.** What does *product* mean?
A. Result or effect.
- Q. 693.** When we multiply 100 by 6, what is the result or answer?
A. 600.
- Q. 694.** What, then, shall we call the 600?
A. The Product.
- Q. 695.** What, then, is the Product?
A. The result or number found by multiplying.
- Q. 696.** We have results in Addition and Subtraction, as well as in Multiplication; is it not, therefore, equally applicable to the three?
A. Custom has restricted its application to Multiplication only.
- Q. 697.** What do you mean by *restricted*?
A. Confined, limited, fixed.
- Q. 698.** How many are 4 times 200? Which number is the product? Why? (695.) Which, the multiplicand? Why? (690.) Which, the multiplier? Why? (691.)
- Q. 699.** Subtract 300 from 600. Which number is the Minuend? Why? (637.) Which, the Subtrahend? Why? (638.) Which, the Difference, or Remainder? Why? (630.)
- Q. 700.** What is the amount of 200 and 300? Why? (585.)
- Q. 701.** Will you repeat the Table of Avoirdupois Weight, backwards? Time? Circular Motion?

SIMPLE DIVISION.

- Q. 702.** What will 100 pounds of pork cost, at 4 cents a pound? How many pounds of pork will 400 cents buy, at 4 cents a pound?
- Q. 703.** A father divides all his property, amounting to 300 dollars, equally among his 3 sons. How many dollars will each son have? 3 in 300, how many times? 3 times 100 are how many?
- Q. 704.** A - 300 dollars, gave 100 to each son.
 " " " " 10 in 300, how many times? 100
 miles in 10 days, going an equal
 way that for each day? 10 in
 100 are how many?

Q. 706. If you travel 8 miles an hour, how long will it take you to travel 96 miles? 48 miles? 64 miles?

Q. 707. How many times 200 in 400? Why?

Q. 708. How many times 100 in 400? Why?

Q. 709. How many times 200 in 600? Why?

Q. 710. How many times 300 in 600? Why?

Q. 711. How many times 400 in 800? Why?

Q. 712. How many times 300 in 900? Why?

Q. 713. How many times 200 in 800? Why?

Q. 714. How many times 400 in 900? Why?

Q. 715. John, having $\frac{3}{4}$ of an orange, divided it equally among his 3 little brothers. How much did each receive? $\frac{3}{4}$ in $\frac{3}{4}$, how many? Why? [$\frac{3}{4}$ times $\frac{1}{4}$ are $\frac{3}{4}$.] $\frac{2}{4}$ in $\frac{2}{4}$, how many? Why?

Q. 716. Two in $\frac{2}{3}$, how many? Why?

Q. 717. Three in $\frac{3}{40}$, how many? Why?

Q. 718. Four in $\frac{4}{5}$, how many? Why?

Q. 719. Four in $\frac{4}{12}$, how many? Why?

Q. 720. Three in $\frac{6}{7}$, how many? Why?

Q. 721. Five in $\frac{5}{7}$, how many? Why?

Q. 722. A man left his property, consisting of only one farm, with directions to have it divided equally among his 4 sons; what proportion is that for each? $\frac{4}{4}$ in 1, how many? $\frac{4}{4}$ times 1 quarter, how much?

Q. 723. A mother has but one pie, and eight children: must she cut it into sevenths or eighths, to give to one as much as to the other? $\frac{8}{8}$ in 1, how many? [$\frac{1}{8}$ eighth.] 8 times $\frac{1}{8}$ eighth, how much?

Q. 724. Eight in 1, how many? Why?

Q. 725. Six in 1, how many? Why?

Q. 726. Six in 2, how many? Why?

Q. 727. Six in 3, how many? Why?

Q. 728. Nine in 5, how many? Why?

Q. 729. Five in 4, how many? Why?

Q. 730. At $\frac{1}{4}$ of a dollar a bushel, how many bushels can you buy for $\frac{3}{4}$ of a dollar? $\frac{1}{4}$ in $\frac{3}{4}$, how many times?

Q. 731. At $\frac{2}{8}$ of a dollar a yard, how many yards can we buy for $\frac{6}{8}$? $\frac{2}{8}$ in $\frac{6}{8}$, how many times? 3 times $\frac{2}{8}$, how many?

Q. 732. One fourth in $\frac{3}{4}$, how many? Why?

Q. 733. One third in $\frac{2}{3}$, how many? Why?

Q. 734. One fifth in $\frac{3}{5}$, how many? Why?

Q. 735. Two fifths in $\frac{4}{5}$, how many? Why?

Q. 736. Three eighths in $\frac{6}{8}$, how many?

Q. 737. What name have the foregoing exercises and why?

A. Division, because *division* signifies *dividing*.

Q. 738. If you divide 40 into 4 equal parts, how much will each part contain? How much greater, then, is 40 than 5? How many times 4 in 40, then?

Q. 739. Hence you perceive, that to divide a number into equal parts is the same thing, in effect, as to find how many times one number is contained in another: what, then, may both exercises be called? [Division.]

Q. 740. Four from 20, how many? 4 from 16, how many? 4 from 12, how many? 4 from 8, how many? 4 from 4, how many? How many times have you subtracted 4? If you have taken 4 from or out of 20, 5 times, how many times, then, is 4 contained in 20?

Q. 741. Hence we see that, by several operations, we can perform Division by Subtraction; but which appears to be the shorter process, Subtraction or Division?

Q. 742. From the foregoing illustrations, we derive the following definition of Division. Will you repeat it?

A. Division is finding how many times one number is contained in another.

Q. 743. What process does it shorten? A. Subtraction.

Q. 744. How does it shorten it?

A. By preventing many tedious subtractions.

Q. 745. Divide 40 apples equally among 8 boys: how many will each have?

Q. 746. Which number is divided here? What, then, shall we call the 40? A. The Dividend.

Q. 747. Why does it receive this name?

A. Because *dividend* signifies to be divided.

Q. 748. What, then, is the Dividend?

A. The number which is to be divided.

Q. 749. What does *divisor* signify?

A. That which divides, or divider.

Q. 750. How many times is 100 contained in 600? Which number is it here that divides the other?

Q. 751. What, then, shall we call the 100?

A. The Divisor.

Q. 752. What, then, is the Divisor?

A. That number by which we divide.

Q. 753. What does *quotient* signify?

A. How often, or how many times.

Q. 754. How many times are there 4 in 20?

Q. 755. What, then, shall we call the 5?

A. The Quotient.

756. What, then, is the Quotient?

Th- - - times the Divisor is contained in

equally among 6 men: how

?
dollar left, or remaining ur

Q. 758. What, then, shall we call the 1 that remains?

A. The Remainder.

Q. 759. How many times 6 in 20? [3, and 2 remainder.] 6 in 21? 6 in 22? 6 in 23? 6 in 24? Is there any remainder in dividing 24 by 6? At one time we had 2 for a remainder, at another 3, at another 4, and at another 5; but in no instance 6, a number equal to the divisor. Can, then, the proper remainder be equal to the divisor? Can it be greater than the divisor, or should it be less?

Q. 760. What, then, is the Remainder?

A. That number which is sometimes left, after the division is performed, is called the Remainder, which must always be less than the Divisor.

Q. 761. How many times is 100 contained in 501? [5 times, and 1 remaining.] Which of these numbers is the Divisor? Why? (752.) Which, the Dividend? Why? (748.) Which, the Quotient? Why? (756.) Which, the Remainder? Why? (760.)

MISCELLANEOUS EXERCISES.

Q. 762. Into how many equal parts must any thing be divided, to make halves? [2.] If you divide 2 into 2 equal parts, how much will each part be? [1.] What part of 2, then, is 1? [1 half.] Why is 1, one half of 2? [2 ones make 2.] 1 half of 4 is how much? [2.] Why? [2 twos make 4.] 1 half of 8, how much? [4.] Why? [2 fours make 8.] 1 half of 12? [6.] Why? [2 sixes make 12.] 1 half of 24, how much? [12.] Why? [2 twelves make 24.]

Q. 763. John divides 6 apples equally between 2 boys; how many does each boy receive? [3.] When any number or thing is divided into 3 equal parts, what is one part called? [1 third.] What part of 6, then, is 2? [1 third.] Why is two 1 third of 6? [3 twos make 6.] 1 third of 9 is how much? [3.] Why? [3 threes make 9.] 1 third of 12, how much? Why? [3 fours make 12.] 1 third of 24 is how much? [8.] Why? [3 eights make 24.] 1 third of 36 is how much? [12.] Why? [3 twelves make 36.]

Q. 764. When any thing is divided into 4 equal parts, what is one part called? [1 quarter.] Will you divide 8 into 4 equal parts? [2.] What part of 8, then, is 2? [1 quarter.] Why is two 1 quarter of 8? [4 twos make 8.] 1 quarter of 12 is how much? [3.] Why? [4 threes make 12.] 1 quarter of 24 is how much? [6.] Why? [4 sixes make 24.] 1 quarter of 32? [8.] Why? [4 eights make 32.] 1 quarter of 48? Why?

Q. 765. When any thing is divided into 5 equal parts, what is one part called? [1 fifth.] Will you divide 10 into 5 equal parts? [2.] What part, then, of 10 is 2? [1 fifth.] Why is two fifths of 10? [5 twos make 10.] 1 fifth of 20? [4.] Why [5 fours make 20.] 1 fifth of 30? [6.] Why? [5 sixes make 30.] 1 fifth of 60? [12.] Why? [5 twelves make 60.]

Q. 766. How many twos make 12? [6.] What, then, is sixth of 12? 1 sixth of 18, how much? [3.] Why? [6 threes make 18.] 1 sixth of 24? [4.] Why? [6 fours make 24.] sixth of 36? [6.] Why? 1 sixth of 72? [12.] Why?

Q. 767. John has 14 cents, and gives 1 seventh of them to Henry. How many did Henry receive? [2.] Why is 2 seventh of 14? [7 twos make 14.] 1 seventh of 28? [4.] Why? [7 fours make 28.] 1 seventh of 56? [8.] Why? [8 eights make 56.] 1 seventh of 84? [12.] Why?

Q. 768. What is 1 eighth of 8? [1.] Why? [8 ones make 8.] 1 eighth of 16? [2.] Why? [8 twos make 16.] 1 eighth of 40? [5.] Why? [8 fives make 40.] 1 eighth of 48? [6.] Why? [8 sixes make 48; that is, 6 times 8 are 48.] 1 eighth of 80? Why? [8 times 10 are 80.] 1 eighth of 96? Why?

Q. 769. How much is 1 ninth of 18? [2.] Why? [9 times are 18.] 1 ninth of 36? Why? 1 ninth of 81? of 27? 45? 108 1 tenth of 20? [2.] Why? 1 tenth of 30? 40? 60? 80? 120

Q. 770. John, having eighteen peaches, gives 1 third of them to William, and 2 thirds to Thomas. How many did William receive? How many did John receive? 1 third of 18 is how much? If 6 is 1 third of 18, how much is 2 thirds of eighteen [12.]

1 third of 9, how much?	1 sixth of 12, how much?
2 thirds of 9, how much?	5 sixths of 12, how much?
1 quarter of 12, how much?	1 seventh of 14, how much?
3 quarters of 12, how much?	5 sevenths of 14, how much?
1 fifth of 10, how much?	1 eighth of 64, how much?
3 fifths of 10, how much?	3 eighths of 64, how much?
1 fifth of 30, how much?	1 tenth of 50, how much?

Q. 771. How is it customary to express thirds, quarters, &c.

A. By figures, only.

Q. 772. How can you express 1 half [$\frac{1}{2}$] in this manner?

A. By placing a 2 under the 1, with a line between both.

Q. 773. How would you express 2 thirds? [$\frac{2}{3}$.]

A. Place the 3 under the 2, with a line between them.

Q. 774. How would you express 3 quarters? [$\frac{3}{4}$.]

A. Place the 4 under the 3, with a line between.

Q. 775. How is it customary to express 3 eighths? [$\frac{3}{8}$.]

A. Place the 8 under the 3, with a line between them.

Q. 776. How is it customary to express 1 quarter? [$\frac{1}{4}$.] 2 thirds? [$\frac{2}{3}$.] 1 eighth? [$\frac{1}{8}$.]

Q. 777. How many twos in 6? How much, then, many times 3 in 12? How much, then, is $\frac{1}{4}$ of 1

Q. 778. When 4 bushels of corn cost 2 dollars, or 200 cents, how much is it a bushel? $\frac{1}{4}$ of 200 is how much? What will 2 bushels cost? $\frac{1}{2}$ of 2 is how much? If, then, 2 bushels cost 50 cents, what will 3 bushels cost? 4 bushels cost? 6 bushels cost? 7? 8? 10?

Q. 779. What will 3 yards of cloth cost, at 20 cents a yard? What will 4 yards? 5 yards? 7?

Q. 780. Will you repeat the following Table, which begins with—2 times 1 in 2; then, $\frac{1}{2}$ of 2 is 1?

TABLE.

2	times	1	in	2;	then,	$\frac{1}{2}$	of	2	is	1.
3	times	2	in	6;	then,	$\frac{1}{3}$	of	6	is	2.
4	times	3	in	12;	then,	$\frac{1}{4}$	of	12	is	3.
5	times	4	in	20;	then,	$\frac{1}{5}$	of	20	is	4.
6	times	5	in	30;	then,	$\frac{1}{6}$	of	30	is	5.
7	times	6	in	42;	then,	$\frac{1}{7}$	of	42	is	6.
8	times	7	in	56;	then,	$\frac{1}{8}$	of	56	is	7.
9	times	8	in	72;	then,	$\frac{1}{9}$	of	72	is	8.
10	times	9	in	90;	then,	$\frac{1}{10}$	of	90	is	9.
11	times	10	in	110;	then,	$\frac{1}{11}$	of	110	is	10.
12	times	11	in	132;	then,	$\frac{1}{12}$	of	132	is	11.

Q. 781. If 2 gallons of molasses cost 50 cents, how much is it a gallon? $\frac{1}{2}$ of 50 is how much? What will 3 gallons cost? 4 gallons?

Q. 782. If 4 pounds of sugar cost 48 cents, what will one pound cost? $\frac{1}{4}$ of 48 is how much? What will 2 pounds cost? $\frac{1}{2}$ of 48 is how much? Will 3 pounds cost? $\frac{3}{4}$ of 48 is how much? 5 pounds cost? [60.] 6 pounds cost? 8 pounds cost?

Q. 783. If 10 yards of ribbon cost 50 cents, what will 2 yards cost? [1 yard will cost 5 cents; then 2 will cost 10.] 3 yards cost? 4? 5? 6? 8? 10?

Q. 784. How many pounds of cheese may be bought for 25 cents, when 3 pounds cost $37\frac{1}{2}$ cents? [If 3 pounds cost $37\frac{1}{2}$ cents, then 1 pound will cost one 9-pence, and 2 pounds 2 nine-pences.] How many pounds may be bought for 50 cents? 60 cents are 4 ninepences; 4 pounds, then, for 62 $\frac{1}{2}$ cents. cents? 1 dollar? $1\frac{1}{2}$? $1\frac{1}{4}$? $1\frac{3}{4}$? $1\frac{1}{2}$? $1\frac{1}{4}$? $1\frac{3}{4}$? 2? 2 $\frac{1}{2}$? 3? 5 $\frac{1}{2}$? 6 $\frac{1}{2}$? 7 $\frac{1}{2}$? 8 $\frac{1}{2}$? 10?

is it a barrel? what will 2 barrels cost? If, then, 20 barrels cost 40 dollars, what will 2 cost? 3 cost? $3\frac{1}{2}$? [2 dollars for 1 barrel, is 1 dollar for one half a barrel. *A.* 7 dollars.] $4\frac{1}{2}$ barrels cost? $5\frac{1}{2}$ cost? $7\frac{1}{2}$ cost? 8? How many barrels may be bought for 2 dollars? [1.] for 4? 3? 5? 6? 7? 8? 9? 10?

Q. 786. John bought 4 oranges for 25 cents; what will 3 cost at that rate? [They are fourpence-halfpenny apiece.] 2 cost? 5? 7? 6? 9? 10? 12? 13? 15? 16? 17? 19? 21? 27? 30? 32? How many can he buy for $6\frac{1}{4}$ cents? $18\frac{1}{4}$ cents? $31\frac{1}{4}$ cents? $37\frac{1}{4}$? 50? $56\frac{1}{4}$? $87\frac{1}{4}$? 100?

Q. 787. If 8 pounds of butter cost 1 dollar, what is the price by the pound? What will 2 pounds cost? If, then, 8 pounds cost a dollar, what will 2 pounds cost? 3 pounds? 5 pounds? $5\frac{1}{2}$ pounds? [If 1 pound cost $12\frac{1}{2}$ cents, or ninepence, 1 half of a pound will cost 4-pence-halfpenny.] $6\frac{1}{2}$ pounds? 7? $7\frac{1}{2}$? 8? $9\frac{1}{2}$? 12? 13? $15\frac{1}{2}$? 16? 17? How many pounds will $12\frac{1}{2}$ cents buy? 25 cents buy? $37\frac{1}{2}$? $62\frac{1}{2}$? $68\frac{1}{2}$? [$5\frac{1}{2}$.] 75? 1 dollar? $1\frac{1}{2}$? $1\frac{3}{4}$? $1\frac{1}{2}$? $1\frac{3}{4}$? 2?

Q. 788. If you give 56 dollars for 7 barrels of flour, what will 8 barrels cost at the same rate? [Find what one will cost first.] What will 3 barrels cost? 5? 9? 10? 12? 100?

Q. 789. If $\frac{1}{4}$ of a yard of broadcloth cost 1 dollar, what will $\frac{1}{4}$ cost? $\frac{3}{4}$? $\frac{1}{2}$? $\frac{1}{4}$? 1 yard? $1\frac{1}{4}$? $1\frac{1}{2}$? $2\frac{1}{4}$? $3\frac{1}{4}$? $4\frac{1}{4}$? $5\frac{1}{4}$? $6\frac{1}{4}$? 8?

Q. 790. If 40 tons of hay will keep 400 sheep over the winter, how many tons will keep 100 sheep the same time? [How many sheep will eat one ton?] Will keep 20 sheep? 40? 60? 80? 200?

Q. 791. If 300 horses eat 900 tons of clover hay in 6 months, how many tons will 200 horses eat? [One horse eats 3 tons.] Will 10 horses eat? 11 eat? 12? 15? 20? 30? 50? 100? 101? 105? 1? If 1 horse eats 3 tons in 6 months, how much will he eat in 12 months? [Twice as much as in 6 months.] Will 2 eat in 12 months?

Q. 792. If 10 men can reap a field of grain in 10 days, how long will it take one man to reap the same? [1 man will be 10 times as long as 10 men. *A.* 100.] Will it take 2 men to reap it? [Half as long as one man; that is, 50.] Will 4 men reap it? [$\frac{1}{4}$ of 100.]

Q. 793. If 6 men can build a wall in 12 days, how long will it take one man to do the same? [6 times as long as 6 men.] How long will it take 2 men to do it? [$\frac{1}{2}$ of 72.] 3 men to do it? [$\frac{1}{3}$ of 72.] 4 men to do it? [$\frac{1}{4}$ of 72.] 6 men to do it? [$\frac{1}{6}$ of 72.] 12 men to do it? [$\frac{1}{12}$ of 72.]

Q. 794. If 4 men can build a store in 20 days, how many can do the same in 40 days? [The more days, the less men to do the same work. Twice as many days will require 1 half as many men will do it in 80 days? [4 times as many men will require but 1 quarter as many men.]

Q. 795. If 8 men can build a store in 20 days, how many men will do the same in 40 days? in 80 days? in 160 days? In how many days will 4 men do it? In how many days will 2 men do it? Will 1 man do it?

Q. 796. If 3 loaves of bread cost 12 cents, what will 2 cost? What is 2 times $\frac{1}{3}$ of 12? What is $\frac{1}{3}$ of 12? $\frac{1}{3}$ of 6? What is $\frac{2}{3}$ of 6? What is 2 times $\frac{1}{3}$ of 6?

Q. 797. If 4 pounds of cheese cost 36 cents, what will 3 pounds cost? What is 3 times $\frac{1}{4}$ of 12? What is $\frac{1}{4}$ of 8? What is 2 times $\frac{1}{4}$ of 8? 2 times $\frac{3}{4}$ of 8? [3 times as much as $\frac{1}{4}$.]

Q. 798. Suppose 5 barrels of cider cost 10 dollars; what will 2 cost? What is 2 times 1 fifth of 10? What will 3 barrels cost? What is 3 times 1 fifth of 10? Will 4 barrels cost? What is 4 times 1 fifth of 10? What, then, is 4 fifths of 10?

Q. 799. Will you repeat the following Table, which begins with $\frac{1}{2}$?

TABLE.

$\frac{1}{2}$	of	3	is	1; then,	$\frac{2}{3}$	of	3	is	2.
$\frac{1}{4}$	of	8	is	2; then,	$\frac{3}{4}$	of	8	is	6.
$\frac{1}{5}$	of	15	is	3; then,	$\frac{4}{5}$	of	15	is	12.
$\frac{1}{6}$	of	24	is	4; then,	$\frac{5}{6}$	of	24	is	20.
$\frac{1}{7}$	of	35	is	5; then,	$\frac{6}{7}$	of	35	is	30.
$\frac{1}{8}$	of	48	is	6; then,	$\frac{7}{8}$	of	48	is	42.
$\frac{1}{9}$	of	63	is	7; then,	$\frac{8}{9}$	of	63	is	56.
$\frac{1}{10}$	of	80	is	8; then,	$\frac{9}{10}$	of	80	is	72.
$\frac{1}{11}$	of	99	is	9; then,	$\frac{10}{11}$	of	99	is	90.
$\frac{1}{12}$	of	120	is	10; then,	$\frac{11}{12}$	of	120	is	110.

Q. 800. What is $\frac{3}{4}$ of 8? $\frac{3}{4}$ of 24? 4 fifths of 15? 3 fifths of 25? 5 sixths of 24? 4 sixths of 72? 6 sevenths of 35? 5 sevenths of 70? $\frac{3}{4}$ of 48? $\frac{3}{4}$ of 40? 8 ninths of 63? 5 ninths of 90? 9 tenths of 80? 7 tenths of 50? 10 elevenths of 99? 3 elevenths of 33? 11 twelfths of 120? 7 twelfths of 60?

Q. 801. If 20 bushels of salt cost 40 dollars, what will 12 bushels cost? What is 12-20ths of 40? What will 15 bushels cost? What is 15-20ths of 40?

To those Teachers who adopt this work, or the Author's larger one on the same subject, he takes pleasure in recommending Mr. Shaw's Visible Numerator. This apparatus is exceedingly simple in its construction; so much so, that "every one is surprised that it has not been thought of before." It consists of a series of blocks, admirably adapted, by their comparative size, to convey to the mind of the pupil the relative value of the different orders of units, and to develop, in the same simple manner, the true principles on which the rules of arithmetic are founded.

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PRACTICAL AND MENTAL ARITHMETIC,

On a New Plan, in which Mental Arithmetic is combined with the Use of the Slate; containing a complete System for all practical Purposes; being in Dollars and Cents. Stereotype Edition, revised and enlarged, with Exercises for the Slate. To which is added, a Practical System of Book-Keeping. By ROSWELL C. SMITH.

This work has lately been adopted as a text-book in Washington College, Penn., and has been recommended by the Vermont and Rhode Island School Commissioners for use throughout those states; and it is also extensively in use in Massachusetts, Connecticut, New York, and other parts of the country. It is used in many places on the score of economy, aside from its intrinsic merit, it being one of the cheapest books extant, embracing all that is valuable in the two systems, mental and practical, at the usual price of a treatise on one.

Immediately on its publication, a petition, signed by all the teachers of the public schools in Providence, was presented to the Town-Council, setting forth the defects of the works on arithmetic in common use, and expressing their "decided preference" of Mr. Smith's work over any other, and praying that it might be introduced into their schools. The petition was referred to a sub-committee, consisting of Rev. F. WAYLAND, Jr. (Chairman), Rev. T. T. WATERMAN, and Wm. T. GRINNELL, Esq., who, after visiting the public schools in Boston, for the purpose of obtaining general information on the subject of education, reported, "that it would be expedient to introduce the system of Arithmetic, published by Mr. Smith, into all the public grammar schools," &c. It was accordingly directed to be used in all the public schools in the town.

From the Philanthropist and Investigator.

"His course we conceive to be a sober medium between the extremes of the inductive and synthetic systems, or, rather, a specimen of the rational and alternate use of both, according to their proper spirit and design."

From the United States' (Philad.) Gazette.

"The plan of combining mental arithmetic with the use of the slate is good; and we should suppose that Mr. Smith's work (the book he has) would be found useful to teachers and learners; especially considering the simplicity of its arrangements, and the care which he has taken in forming his table of questions, without which the book can be considered as complete."

PREFACE

TO SMITH'S LARGER ARITHMETIC.

"WHEN a new work is offered to the public, especially on a subject abounding with treatises like this, the inquiry is very naturally made, 'Does this work contain any thing new?' 'Are there not a hundred others as good as this?' To the first inquiry it is replied, that there are many things which are believed to be new; and, as to the second, a candid public, after a careful examination of its contents, and not till then, it is hoped, must decide. Another inquiry may still be made: 'Is this edition different from the preceding?' The answer is, Yes, in many respects. The *present* edition professes to be strictly on the Pestalozzian, or inductive, plan of teaching. This, however, is not claimed as a novelty. In this respect, it resembles many other systems. The novelty of this work will be found to consist in adhering more closely to the true spirit of the Pestalozzian plan; consequently, in differing from other systems, it differs less from the Pestalozzian. This similarity will now be shown.

"1. The Pestalozzian professes to unite a complete system of Mental with Written Arithmetic. So does this.

"2. That rejects no rules, but simply illustrates them by mental questions. So does this.

"3. That commences with examples for children as simple as this, is as extensive, and ends with questions adapted to minds as mature.

"Here it may be asked, 'In what respect, then, is this different from that?' To this question it is answered, In the execution of our common plan.

"The following are a few of the prominent characteristics of this work, in which it is thought to differ from all others.

"1. The interrogative system is generally adopted throughout this work.

"2. The common rules of Arithmetic are exhibited so as to correspond with the occurrences in actual business. Under this head is reckoned the application of *Ratio* to practical purposes, *Fellowship*, &c.

"3. There is a constant recapitulation of the subject attended to, styled '*Questions on the foregoing.*'

"4. The mode of giving the individual results without points, then the aggregate of these results, with points, for an answer by which the relative value of the whole is determined, thus furnishing a complete test of the knowledge of the pupil. This is a characteristic difference between this and the former editions.

"5. A new rule for calculating interest for days with months.

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"6. The mode of introducing and conducting the subject of Proportion.

"7. The adoption of the Federal Coin, to the exclusion of Sterling Money, except by itself.

"8. The Arithmetical Tables are practically illustrated, previously and subsequently to their insertion.

"9. As this mode of teaching recognizes no authority but that of reason, it was found necessary to illustrate the rule for the extraction of the Cube Root, by means of blocks, which accompany this work.

"These are some of the predominant traits of this work. Others might be mentioned, but, by the examination of these, the reader will be qualified to decide on their comparative value.

"As, in this work, the common rules of Arithmetic are retained, perhaps the reader is ready to propose a question frequently asked, 'What is the use of so many rules?' 'Why not proscribe them?' The reader must here be reminded, that these rules are taught differently, in this system, from the common method. The pupil is first to satisfy himself of the truth of several distinct mathematical principles. These deductions, or truths, are then generalized; that is, briefly summed in the form of a rule, which, for convenience' sake, is named. Is there any impropriety in this? On the contrary, is there not a great convenience in it? Should the pupil be left to form his own rules, it is more than probable he might mistake the most concise and practical one. Besides, different minds view things differently, and draw different conclusions. Is there no benefit, then, in *teaching* the pupil to the most concise and practical method of solving the various problems incident to a business life?

"Some have even gone so far as to condemn the Rule of Three, or Proportion, and almost all the successive rules growing out of it. With more reason, they might condemn Long Division, and even Short Division; and, in fact, all the common and fundamental rules of Arithmetic, except Addition; for these may all be traced to that. The only question, then, is, 'To what extent shall we go?' To this it is replied, As far as convenience requires. As the Rule of Three is generally taught, it must be confessed, that almost any thing else, provided the mind of the pupil be exercised, would be a good substitute. But when taught as it should be, and the scholar is led on in the same train of thought that originated the rule, and thus effectually made to see, that it is simply a convenient method of arriving at the result of both Multiplication and Division combined, its necessity may be advocated with as much reason as any fundamental rule. As taught in this work, it actually saves more figures than Short, compared with Long Division. Here, then, on the ground of convenience, it would be reasonable to infer, that its retention was more necessary than either. But, waiving its utility in this respect, there is another view to be taken of this subject, and that not the least in importance, viz. the ideas of beauty arising from viewing the harmonious relations of numbers. Here is a delightful field for an inquisitive mind. It here imbibes truths as lasting as life. When the utility and convenience of this rule are once conceded, all the other rules growing out of this will demand a place, and for the same reason.

"It may, perhaps, be asked by many, 'Why not take the principle with out the name?' To this it is again replied, Convenience forbids. The name, the pupil will see, is only an aggregate term, given to a process *implying several* distinct principles. And is there no convenience in this? *When* in actual business, he obliged to call off his mind *has*, to trace a train of deductions arising from abstract *attention* is most needed on other subjects? With *same* of captain may be dispensed with, for, altho

the general, by merely summoning his captain, may summon 100 men, still he might call on each separately, although not quite so conveniently. With these remarks, the subject will be dismissed, merely adding, by way of request, that the reader will defer his decision till he has examined the doctrine of Proportion, Fellowship, &c., as taught in this work.

"The APPENDIX contains many useful rules, although a knowledge of these is not absolutely essential to the more common purposes of life. Under this head are reckoned Alligation, Roots, Progression, Permutation, Annuities, &c. The propriety of scholars becoming acquainted, some time or other, with these rules, has long since been settled; the only question is, with regard to the expediency of introducing them into our Arithmetics, and not reserving them for our Algebras. In reply to this, the Writer would ask, whether it can be supposed, the development of these truths, by figures, will invigorate, strengthen, and expand the mind less than by letters. Is not a more extensive knowledge of the power of figures desirable, aside from the improvement of the mind, and the practical utility which these rules afford? Besides, there always will, in some nook or other, spring up some poor boy of mathematical genius, who will be desirous of extending his researches to more abstruse subjects. Must he, as well as all others, be taxed with an additional expense to procure a system, containing the same principles, only for the sake of discovering them by letters?

"Position, perhaps, may be said to be entirely useless. The same may be said of the doctrine of Equations by Algebra. If the former be taught rationally, what great superiority can be claimed for the one over the other? Is it not obvious, then, that it is as beneficial to the pupil to discipline his mind by the acquisition of useful and practical knowledge, which may be in the possession of almost every learner, as to reserve this interesting portion of Mathematics for a favored few, and, in the mean time, to divert the attention of the pupil to less useful subjects?

"The blocks, illustrative of the rule for the Cube Root, will satisfactorily account for many results in other rules; as, for instance, in Decimals, Mensuration, &c.; which the pupil, by any other means, might fail to perceive. By observing these, he will see the reason why his product, in decimals, should be less than either factor; as, for instance, why the solid contents of a half an inch cube should be less than half as much as an inch cube. In this case, the factors are each half an inch, but the solid contents are much less than half a solid inch.

"In this work, the author has endeavored to make every part conform to this maxim, viz. THAT NAMES SHOULD SUCCEED IDEAS. This method of communicating knowledge is diametrically opposed to that which obtains, in many places, at the present day. The former, by first giving ideas, allures the pupil into a luminous comprehension of the subject; while the latter astounds him, at first, with a pompous name, to which he seldom affixes any definite ideas, and it is exceedingly problematical whether he ever will. In addition to this is the fact, that, by the last-mentioned method, when the name is given and the process shown, not a single reason of any operation is adduced; but the pupil is dogmatically told he must proceed thus and so, and he will come out so and so. This mode of teaching is very much as if a merchant of this city should direct his clerk, without intrusting him with any business, first to go to South Boston, then to the state-house, afterwards to the market, and then to return, leaving him to surmise, if he can, the cause of all this peregrination. Many are fools enough to take this jaunt pleasantly; others are restiff, and some fractious. This sentiment is fully sustained by an article in Miss Edgeworth's works, from which the following extract is made: 'A child's seeming stupidity, in learning arithmetic, may, perhaps, be a proof of intelligence and good sense. It is easy to make a boy, who does not repeat, by rote, any technical rules, which a common writing or magisterial solemnity, may lay down for him; but a child who not be thus easily managed: he stons, frowns, hesitates, quest'

ter, is wretched and refractory, until he can discover ~~why~~ he is to proceed in such and such a manner; he is not content with seeing his preceptor make figures and lines on the slate, and perform wondrous operations with the self-complacent dexterity of a conjurer; he is not content to be led to the treasures of science blindfold; he would tear the bandage from his eyes, that he might know the way to them again.'

"In confirmation of the preceding remarks, and as fully expressive of the author's views on this subject, the following quotation is taken from the preface to Pestalozzi's system.

"The PESTALOZZIAN plan of teaching ARITHMETIC, as one of the great branches of the mathematics, when communicated to children upon the principles detailed in the following pages, needs not fear a comparison with her more favored sister, GEOMETRY, either in precision of ideas, in clearness and certainty of demonstration, in practical utility, or in the sublime deductions of the most interesting truths.

"In the regular order of instruction, arithmetic ought to take precedence of geometry, as it has a more immediate connection with it than some are willing to admit. It is the science which the mind makes use of in measuring all things that are capable of augmentation or diminution; and, when rationally taught, affords to the youthful mind the most advantageous exercise of its reasoning powers, and that for which the human intellect becomes early ripe, while the more advanced parts of it may try the energies of the most vigorous and matured understanding.'

THE AUTHOR

"January, 1829."

ADVERTISEMENT TO THE KEY

WHICH ACCOMPANIES SMITH'S LARGER ARITHMETIC.

"THE utility, and even necessity, of a work of this description, will scarcely be questioned by those who have had any experience in teaching Arithmetic. Most young persons, after having been persuaded again and again to review a long arithmetical process, feel, or affect to feel, certain that they have performed it correctly, although the result, by the book, is erroneous. They then apply to their instructor, and unless he points out their mistake, or performs the operation for them, they become discouraged, think it useless 'to try' longer, and the foundation for a habit of idleness is thus imperceptibly established. Now, in a large school, it is always inconvenient, and sometimes impossible, for the instructor to devote the time necessary to overlook or perform a very simple, much more a complex, question in Arithmetic. This is at once obviated by having at hand a Key, to which reference can be easily and speedily made. The time of the teacher will thus be saved, and the pupil will not have his ardor damped by being told that 'his sum is wrong,' without learning where or how.

"This work is not designed for, and can scarcely become, a help to laziness; but is to lighten the burden of teachers, and facilitate the progress of these important purposes, it is now presented



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